TRANSACTIONS

OF THE

SEVENTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS

WITH THE

UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE

WASHINGTON, JUNE 2, 1909

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Med
Public Health Bulletin 31

TREASURY DEPARTMENT
Public Health and Marine-Hospital Service of the United States

TRANSACTIONS OF THE

Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service

WASHINGTON, D. C.
JUNE 2, 1909

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WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
Washington, D. C., January 24, 1910.

SIR: I have the honor to transmit herewith the transactions of the seventh annual conference of state and territorial boards of health with the United States Public Health and Marine-Hospital Service, held in Washington, June 2, 1909, in accordance with section 7, act of Congress approved July 1, 1902.

The transactions of this conference relating to the public health during the year 1909 are of interest, and they are published for distribution to State health authorities and others to whom they will be of value.

Respectfully,

WALTER WYMAN,
Surgeon-General.

The SECRETARY OF THE TREASURY.

LETTER CALLING SEVENTH ANNUAL CONFERENCE.

The following letter was addressed to the health authorities of each State, Territory, and the District of Columbia:

TREASURY DEPARTMENT,
PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE,
Washington, April 21, 1909.

DEAR DOCTOR: I have to inform you that the seventh annual conference of state and territorial health officers with the Public Health and Marine-Hospital Service will be held at the bureau, Washington, D. C., June 2 and 3, 1909. Each State and Territory, including the District of Columbia, will be entitled to one representative at this conference.

There is forwarded herewith a tentative programme of the subjects which will be discussed during the meetings.

It is hoped that there will be a full representation at the conference, and I would request that I be informed in advance of the name of the delegate who will represent your board.

Respectfully, WALTER WYMAN,
Surgeon-General.

SEVENTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL BOARDS OF HEALTH WITH THE SURGEON-GENERAL OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

TRANSACTIONS.

MORNING SESSION.

JUNE 2, 1909.

The seventh annual conference of state and territorial health authorities with the Public Health and Marine-Hospital Service was called to order at the Bureau of Public Health and Marine-Hospital Service by Surg. Gen. Walter Wyman at 10.40 a. m., June 2, 1909, the following being present:

United States Public Health and Marine-Hospital Service: Surg. Gen. Walter Wyman, Asst. Surg. Gen. J. W. Kerr, Passed Asst. Surg. L. L. Lumsden, and Passed Asst. Surg. A. M. Stimson.

Arizona: Dr. E. S. Godfrey.
California: Dr. W. Le Moyne Wills.
Colorado: Dr. A. L. Bennett.
Delaware: Dr. A. E. Frantz.
District of Columbia: Dr. Wm. C. Woodward.
Florida: Dr. Joseph Y. Porter.
Georgia: Dr. H. F. Harris.
Hawaii: Dr. L. E. Cofer.
Illinois: Dr. F. A. Tucker.
Indiana: Dr. J. N. Hurty.
Iowa: Dr. A. C. Moerke.
Maryland: Dr. Marshall Langton Price.
Massachusetts: Dr. Mark W. Richardson.
Minnesota: Dr. H. M. Bracken.
New York: Dr. Eugene H. Porter and Mr. A. H. Seymour.
North Carolina: Dr. R. H. Lewis.
North Dakota: Dr. J. Grassick.
Ohio: Dr. C. O. Probst and Dr. Byron Stanton.
Oregon: Dr. Andrew C. Smith.
Pennsylvania: Dr. Herbert Fox.
Rhode Island. Dr. Gardner F. Swarts.
South Carolina: Dr. C. F. Williams.
Texas: Dr. Wm. H. Brumby.
Vermont: Dr. Henry D. Holton.
Virginia: Dr. Ennion G. Williams.
Washington: Dr. Eugene R. Kelley.
Wisconsin: Dr. C. A. Harper.

The SURGEON-GENERAL. I wish in opening the seventh annual conference of state and territorial health officers with the Public Health and Marine-Hospital Service to refer to a matter that is quite uppermost and that was brought to the attention of the last conference. I refer to the public-health measure that we so thoroughly discussed, and wish to inform you concerning the disposition of the same. Up to March 4, 1909, we worked hard to have the bill enacted into law. It passed the Senate and was reported favorably by the House Committee on Interstate and Foreign Commerce after several hearings and most thorough discussion. The members of the House committee seemed to take a great deal of interest in it, and we felt that a great deal had really been accomplished in having it reported favorably by the committee. Certain of the leaders in the House, however—including the Speaker—while friendly in a general way to the Public Health and Marine-Hospital Service and friendly to public-health work, as represented by you gentlemen particularly, were opposed to allowing any public-health legislation going through that looked to further expenditures, or a further extension of the field of expenditures by the General Government, while the revenues of the country were in the condition in which they were reported to be. I endeavored to show to these gentlemen that the amount of expenditure contemplated or made possible by the passage of the bill would be limited; that practically the bill, so far as the general work of the Government in the States was concerned, related to investigations and the publication of reports of the same, and with an occasional detail of officers by request of the boards of health in the different States, whose traveling expenses and salaries would not constitute a large increase of the public expenditure. There were, however, a great many other bills and measures before Congress of a like character, so far as public expenditure was concerned, and I must say that the Speaker and his colleagues were very consistent. They refused to lend their support to such measures as increase of the salary of the President or Vice-President, the Speaker, and the judges of the United States courts, and I suppose that if any exception had been made at all it would have been very difficult for them to have done so without being obliged to recognize others. This is the only reason so far as I can make out for failure to pass the bill; in fact, I feel very confident that it is the explanation of the matter. It also affected the other bill which, with slight amendment, was passed by the Senate and favorably reported by the House committee, although there were three who signed a minority report. This latter bill was intended to improve the status of the corps, bringing the salaries, which are now what they were twenty years ago, up to the point that is necessary to make them equal to that of the other medical officers of the Government. The minority report on the bill simply stated that the reason of those who signed it was that they

objected to any increase of salaries while the revenues were in the condition they were. I have great hopes, therefore, that at the next session matters will have so adjusted themselves that both of these measures will be enacted into law. They have both been reintroduced into the present Congress, but this session was convened for a special purpose, and committees have not been called upon to consider other matters than the tariff, and we do not expect any action at this special session. I thought it due to you gentlemen to let you know just how these measures stand. Of course we were disappointed because we could have been doing a great many things in cooperation with you gentlemen we can not do now under existing law. Many of them we have frequently discussed.

As to the programme of the conference it is proposed to discuss to-day a number of important subjects that have been engaging the attention of this bureau and have a relation not only to national but to state work, in which we are both interested and in which we can cooperate with one another. In bringing these subjects before the conference it is intended to inform you of what we have done, show the relation of our work to yours, and get any suggestions you may choose to give us. It is hoped that there will be as free a discussion as you choose to make. In accordance with the programme, to-morrow forenoon has been reserved for a visit to the Hygienic Laboratory, the addition to which has just been completed. The laboratory building has been enlarged to three times its original size and two of the divisions moved into the new addition. It is proposed to go there from the New Willard Hotel about half past 9 to-morrow morning. In the four divisions of the laboratory the chief of each division will be on hand to explain the work of the laboratory. Then in the afternoon at half past 2 we shall make a trip down the Potomac to Mount Vernon on the revenue cutter *Yamacraw*, which is now lying at the foot of Seventh street, and which will take us down the river and make a landing at Mount Vernon in order that a visit may be made to that interesting spot. To-day it will be our pleasure (I have no doubt it will be a pleasure to you) to be received by the President. It will be necessary to be at the White House at 1.15 p. m., and we will adjourn therefore in time to go there and simply pay our respects to the President. To-morrow, after having visited the laboratory, we shall call and pay our respects to the Secretary of the Treasury. I shall be glad to take you to his office and he will be very glad to see us.

Now, as to the programme for to-day, it is proposed to discuss, first, the prevalence of rabies; second, the measures against leprosy in the United States since 1902; third, the investigations with regard to typhoid fever in the District of Columbia; fourth cooperative measures against tuberculosis; fifth, cooperative measures against hookworm disease; sixth, supervision of the propagation and sale

of vaccine virus; and seventh, pellagra. These are subjects in which we are all interested, and I have invited to be present some of the officers in the laboratory who have been doing special work on some of these subjects for the information they can give with regard to the operations of the laboratory in connection therewith and in relation to cooperation with the laboratories in your health organizations.

The first subject on the programme is the prevalence of rabies. We were requested by the council of the American Medical Association, which met in Chicago, Ill., December, 1907, to make an investigation of rabies, and on account of its undue prevalence in certain localities we have been doing so. We have been making an investigation with regard to the prevalence of rabies in man throughout the United States. This collective investigation has been carried on in the bureau through the Division of Scientific Research, of which Doctor Kerr has charge, and I shall call on him for a statement of the work done and the results recorded. I shall call on Doctor Stimson also to make a statement as to what has been done with reference to the scientific work of the laboratory in the preparation of antirabic virus that we have been sending out to a number of States. We have been furnishing the virus necessary for the prevention of rabies in patients who have been bitten by rabid dogs or other animals. I shall ask Doctor Kerr now to inform the conference of these things.

THE GEOGRAPHICAL DISTRIBUTION OF RABIES IN THE UNITED STATES IN 1908.

Dr. J. W. Kerr. The legislative council of the American Medical Association, during a meeting held in Chicago, Ill., December, 1907, passed resolutions calling on the Public Health and Marine-Hospital Service to make an investigation of rabies with the view to its prevention and control. Provision for field investigations of rabies had previously been included in the public health bill which was introduced into the Sixtieth Congress, and which it was expected would be enacted into law. In the meantime investigations of rabies were resumed in the Hygienic Laboratory, because there is already a law for the laboratory investigation of contagious and infectious diseases and matters pertaining to the public health. On account of the prevalence of the disease in the District of Columbia and near-by States, and as investigations were already being made in the laboratory, it was also directed by the Surgeon-General to begin the giving of Pasteur treatment from the laboratory to any person in the District of Columbia or who came to the laboratory and applied for it. These applications were made, as a rule, through the health officer of the District of Columbia or on the request of state health officers. Requests were also received from the Isthmian Canal Commission, for the Panama Canal Zone, as rabies prevailed there and in Panama.

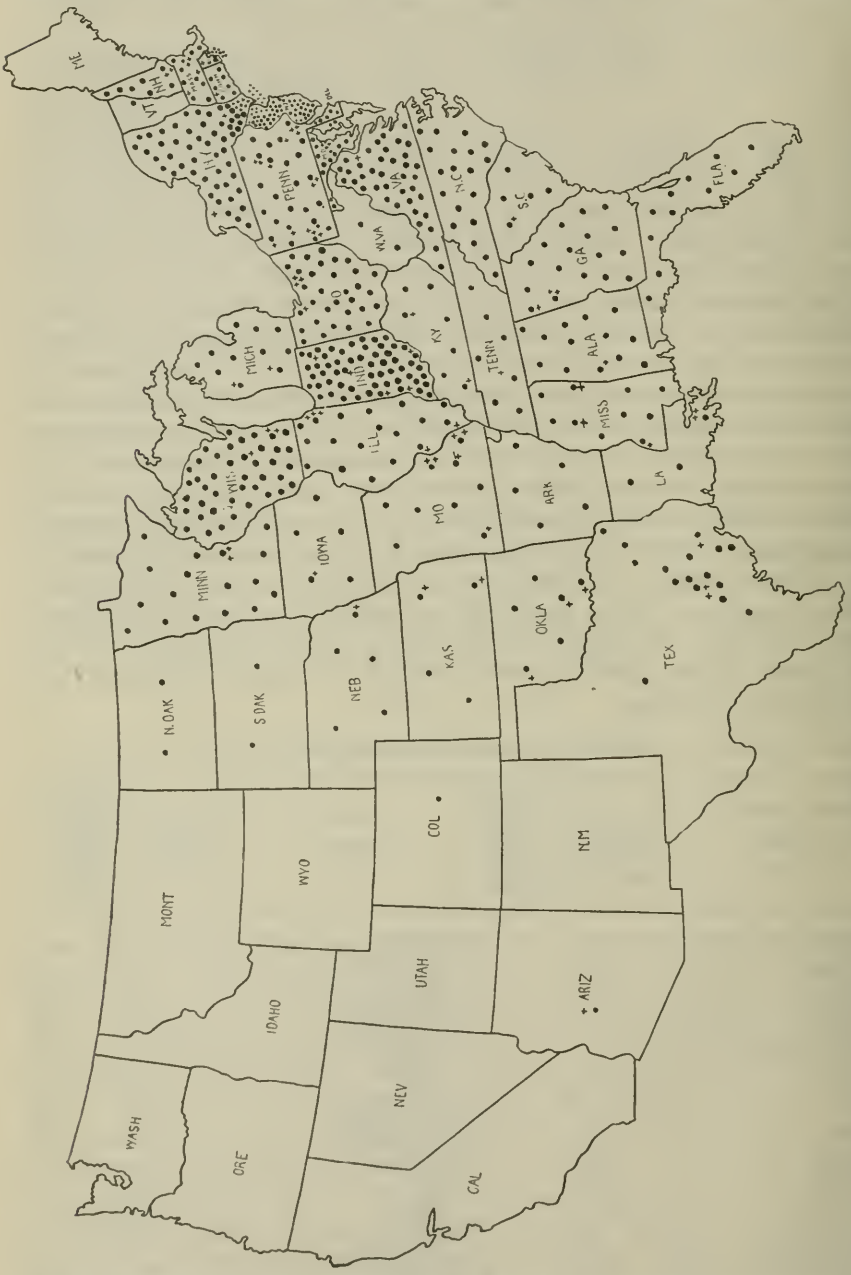
Necessary arrangements were made and a system inaugurated by which rabies virus has been sent to the Isthmian Canal for approximately a year. Several of the States have also been furnished rabies virus on application of their respective state boards of health, the virus being administered under their direction.

In addition to these activities carried on through the laboratory, it was thought well to attempt to determine the geographical distribution of rabies in the United States at the present time. The year 1908 was selected, as it was thought by so doing very definite data would be secured. In order to secure all possible data resort was had to several sources of information, as follows: First, state health authorities; second, local health authorities; third, United States Census Bureau; fourth, Pasteur institutes; fifth, the press-clipping bureau; and sixth, in some instances, other sources. Resort was had to the clipping bureau for reports of dog bites or infection throughout the country. In December there were distributed to state and territorial health authorities and to local health authorities blank forms, upon which to record all the data that were obtainable. We have now practically finished the tabulation of these data. It may be stated here that rabies demonstrates the difficulty of securing accurate statistics in the United States. It is a disease that attracts a good deal of attention, first because of its rarity, second because of its uniform fatality, and third because of the method of its transmission to man. As a result of our studies we have determined that there were 111 deaths from rabies in the United States during last year. These deaths were scattered through 30 States and Territories, as follows:

Rabies in the United States during 1908.

State.	Deaths in man.	Localities in which rabid animals were reported.	State.	Deaths in man	Localities in which rabid animals were reported.
Alabama	1	13	Nevada		
Arizona	1	1	New Hampshire	2	7
Arkansas	1	5	New Jersey	11	41
California			New York	19	52
Colorado		1	New Mexico		
Connecticut	1	7	North Carolina		19
Delaware		5	North Dakota		2
District of Columbia		1	Ohio	4	32
Florida		11	Oklahoma	3	6
Georgia	3	17	Oregon		
Idaho			Pennsylvania	14	25
Illinois	2	18	Rhode Island	1	10
Indiana	5	57	South Carolina	1	5
Iowa	1	5	South Dakota		2
Kansas	2	4	Tennessee	1	7
Kentucky	1	7	Texas	3	15
Louisiana	4	3	Utah		
Maine			Vermont		1
Maryland	6	12	Virginia	1	37
Massachusetts	5	9	Washington		
Michigan	3	11	West Virginia		2
Minnesota	2	18	Wisconsin	3	42
Mississippi	1	10	Wyoming		
Missouri	8	9			
Montana			Total	111	534
Nebraska	1	5			

The deaths are also represented by crosses on the map exhibited, and they are placed in the States to show approximately the area where the infection occurred, and not the death. The causes of death



RABIES IN THE UNITED STATES DURING 1908.

+ Deaths among human beings; position of, shows where infection was received. ● Foci of infection among animals.

of these cases have been verified as far as possible, some of them by necropsy findings, and others clinically.

At the same time we tried to determine the areas of infection among animals and issued blank forms calling for such data as were obtainable. We have been able to determine definitely 534 foci of infection scattered throughout the various States and Territories. Some of the States, as represented by the black dots on the map, appear to have an unusual prevalence of the disease, which is probably to be accounted for by the fact that better reports were received from those States, and probably the disease attracted more attention. The most striking fact brought out by our studies was that the disease during 1908 was confined to the eastern three-fourths of the United States. In the Rocky Mountain and the Pacific coast regions there were no cases reported either among men or animals. The most westerly point at which the disease occurred was Prescott, Ariz. This focus is of interest because it is so isolated and because of the character of animal that transmitted the infection. The disease appeared there among skunks and the single human case was due to the bite of a skunk. The map also shows how relatively little human rabies occurs as compared to areas of infection among animals. In the city of Philadelphia there were 11 areas of infection demonstrated last year among animals and none among men. This report as regards the difficulty of obtaining statistics coincides with Ravenel's statement that statistics of the disease among animals are not obtainable, and Moore, of New York, has also made a similar statement. The Bureau of Animal Industry in 1908 reported that the disease prevailed during that year in 25 States. We have reports to show that rabies prevailed in 39 States and Territories, including the District of Columbia, during the year 1908.

The Surgeon-General. The service has prepared and furnished antirabic virus upon request of state boards of health as stated by Doctor Kerr, the same to be administered under their direction, and I will ask Doctor Stimson to give an account of how the virus was prepared and sent out. Doctor Stimson has had charge of the preparation of the virus and its distribution.

Doctor Stimson. When it was decided to furnish antirabic virus to the state boards of health, we had to consider very carefully just what form we would send it out in. We found that the thing had been attempted before and that it was the custom to send out the emulsion all ready for injection, but that in hot weather, and especially in transmission during summer through the warmer portions of the country, this emulsion was apt to undergo decomposition, and abscesses were apt to result. There was also some suspicion that some decrease in the potency of the virus might occur when it was subjected to that undue temperature. At any rate, the virus when once made into an emulsion is not permanent, and it

should not stand over a few hours unless it is kept under special conditions. We do not inject an emulsion after it has been prepared unless it is fresh. If a patient is due to come for treatment in the morning, and fails to come until the afternoon, a fresh emulsion is made up for him. The virus, however, can be kept under special conditions so as to be both potent and safe for use, and thus it may be shipped to health boards for their administration. This may be done by sending the cord itself, not yet emulsified, but preserved in glycerin, which keeps the potency at its initial grade for as much as a month. The sections of cord are procured in small bottles of glycerin properly sealed and labeled, and wrapped under aseptic conditions. The treatment is in principle the same as that of Pasteur, with the exception that glycerinated cord is used and that the original scheme is modified. Pasteur commenced his injections with fifteen-day cord. Now, cord which has dried for fifteen days is devoid of infection, and in all probability of immunizing qualities. Hence in using cord dried for this length of time, valuable time is being lost. We therefore begin with eight-day cord and use practically the same scheme as is now employed at Berlin. The use of glycerin was originated by Calmette who found that the spinal cord of a rabietic rabbit could be preserved at any particular degree of virulence, by immersion in glycerin, for about a month.

For use, this cord requires to be made up into an emulsion, requiring in the operator a certain degree of facility in bacteriological technique, enough to enable him to prepare it for injection without contamination. Faulty technique is likely to result in abscess formation or more serious complications.

For this reason it is required that virus when sent to the state boards shall be given under their auspices by a person competent to reduce it to an emulsion and inject it under aseptic conditions.

Full directions accompany the shipments of virus as they are sent out. They are sent promptly upon request of the proper officer, either the whole or a half treatment being sent at one time, so that they arrive fully potent and free from contamination.

Some advantages of this method are, full potency, freedom from adulterants (excepting the glycerin in which it is immersed), and freedom from pathogenic organisms. The glycerin is rinsed off before the emulsion is finally made. The only disadvantage of this method of shipment is that it requires some degree of skill in the preparation of the emulsion; but this has been fully met by the laboratories of the health boards to whom it has been sent. Its use has been entirely satisfactory as far as I am aware. We have tried to keep in touch with patients treated in this way and have not heard of any untoward results.

To-morrow morning Doctor Manning, who is carrying on this work at the Hygienic Laboratory at present, will be glad to show all the steps of the preparation of the virus and emulsion and give any desired information pertinent to it.

The SURGEON-GENERAL. The subject is now open for discussion. I will ask Doctor Stimson to make a statement as to the number of state boards supplied.

Doctor STIMSON. I am not in position to give that information.

Doctor BRUMBY. Doctor Kerr mentioned a number of States that have laboratories of their own. How many such are there in the United States?

Doctor KERR. There are not less than 22 Pasteur institutes in the United States, and 9 of them are under government auspices. One is under the New York City board of health, and I presume the other 8 are connected with state boards of health.

Doctor LEWIS. I wish to express my thanks for the virus furnished for the use of our board, and to say that the results have been uniformly successful. So far there has been no death. The number of cases treated up to the present is in the neighborhood of 100. These statements have been made by the director of the laboratory of hygiene, who is a physician as well as a bacteriologist. Our law says that those who are able to pay shall pay such sum as is designated by the proper authority: so we require those who can pay to pay $50 apiece for the treatment. The director has treated free any who are not able to pay the fees. The large majority are treated free, but we have a small income from this source for the support of the laboratory.

Doctor HARPER. Have you a building in which to keep the patients who are taking the treatment?

Doctor LEWIS. We have a laboratory for the administration of the treatment, but they live outside, merely coming for the administration of the virus daily. It is of no expense to us.

Doctor SWARTS. I would like to ask whether it is possible to send a full treatment at one time. Occasionally tubes get broken on the way, and in that case the patient would miss the treatment for a particular day.

Doctor STIMSON. That was the objection to the emulsion I referred to before. It would not be safe to have an emulsion three or four days on the way and then waiting a period of perhaps twenty-one days before administration. Possibly it might stand that length of time, but I do not think it would. There would be some danger in using it, and we so decided. In the case of the glycerinized cord there is no possible chance of its becoming contaminated, and it is only made into emulsion just before being used.

Doctor PORTER (of New York). Will that keep indefinitely?

Doctor STIMSON. Well, its potency will last about a month.

Doctor PORTER (of New York). So that——

Doctor STIMSON. So that we have shipped entire treatments at once, although for convenience it is more the practice at present to send it in two parts.

Doctor SWARTS. But not every day?

Doctor STIMSON. In no case every day.

Doctor LEWIS. We began with the virus of the New York laboratory. The virus was shipped to us in the form of an emulsion, and we paid $25 a treatment. Now that we have this golden opportunity we have taken advantage of it.

The SURGEON-GENERAL. We have a delegate here from the state board of health of South Carolina, which has a representative now in the Hygienic Laboratory making a special study of this matter, with the view to establishing a Pasteur institute in their own State. We would be glad to receive information from him for use in the same way for like purposes in other States.

Doctor WILLIAMS (of South Carolina). Does the Public Health and Marine-Hospital Service send this out free to the state boards of health? I understand North Carolina is charging those patients who are able to pay $50.

Doctor LEWIS. We charge that to the services of the skilled bacteriologist.

Doctor WILLIAMS (of South Carolina). Do you turn that into the treasury?

Doctor LEWIS. Into the treasury of the laboratory.

Doctor BRACKEN. I am glad to know that you are sending the virus only to the state boards of health. It is a dangerous proposition to send it to physicians in general. I do not believe that every physician in the country is fitted to administer Pasteur treatment. In Minnesota we have our own institute and the treatment is free to all citizens of the State. The only expense to the patient is that of travel and board while undergoing treatment.

Doctor PROBST. The statistics presented are very interesting. I want to report an interesting death in Ohio two years ago. A man was bitten by a dog at Lebanon. The dog was never examined, but was supposed to have had rabies. The man died some months later with clinical symptoms of rabies. We succeeded in getting the brain, but inoculation failed to show rabies. Subsequently we had a child die in that same town and the disease was diagnosed rabies, but we were unable to secure a bacteriological examination in this case. Is this discussion also going to include the prevention of rabies? I should be glad, for example, to hear of something we ought to do for the prevention of rabies. The local health authorities in Columbus tried to enforce a very rigid muzzling ordinance. Our mayor is

opposed to it, and our "foremost citizen" came out with a strong article in the paper making very light of any rabies in human beings, and it would be very nearly an impossibility to enforce a muzzling ordinance. But I should be glad to have any information as to measures in force, as state measures or local measures for the prevention of this disease.

Doctor BRACKEN. Is there to be a full report of the investigations made by you for distribution throughout the States?

The SURGEON-GENERAL. There is a report being prepared, but it has not yet been completed. We are giving you the latest data received. Doctor Kerr just explained that map. It gives the deaths of human beings due to rabies during the calendar year 1908, and they are indicated by the crosses. The black dots represent the number of infected areas.

Doctor BRACKEN. I am surprised to see so few infected areas in Minnesota. As a matter of fact, we are treating over 200 cases a year; hence there must be many centers of infection. We have not the complete record of the disease in relation to animals, for rabies among animals is under the supervision of the state live stock sanitary board. It is only when an animal bites a human being that the state board of health becomes interested in the animal.

Doctor KERR. The areas of infection given are those we have been able to positively determine, but they by no means represent the true statistics of the disease among animals in the United States.

Doctor GODFREY. I would like to inquire if only one death was found following a skunk bite.

Doctor KERR. The only report we have was received from Doctor Yount, who communicated with the Hygienic Laboratory a month ago on his own behalf and not in answer to our request for information.

Doctor GODFREY. I understand that in the Pasteur Institute at Austin, Tex., the number of cases treated after having been bitten by skunks stands second on the list, very nearly equal the number treated following dog bites.

Doctor KERR. We have sent requests to all the sources of information of which we had knowledge in your section, Doctor, and this was the only case of the kind reported. We have collected a great many reports of the disease among animals, but unfortunately we are unable to include many of them in our report, as they were not examined in any laboratory or came from some distant point where we could not locate the area. Where we could not locate the area of infection in a State we have not included it in our statistics. These reports represent fairly well the geographical distribution of rabies throughout the country, but must be taken as a minimum as regards prevalence of the disease in the several States and Territories.

Doctor BRUMBY. I am sorry the reports from Texas are so imperfect. I received the blanks from Doctor Kerr and referred them to the proper official. Our board of health has nothing to do with the Pasteur Institute. It is under the supervision of the superintendent of one of our eleemosynary institutions. We have a very fine young man at the head of it—very successful in his work—and he reports 3 deaths in 1908. We have had 6 deaths since the establishment of the institute, which was opened in 1905, nearly five years ago. It has treated 1,300 cases and had 6 deaths. Four were bitten in the face. About 80 per cent were from the State of Texas. Up to the first day of last January our institute, which is revenue producing, turned in about $4,500. There were abscesses in only four instances, showing that the physician in charge is certainly very successful in his work. No cases of paralysis have developed. The treatment is free to indigents, and those able to pay are charged $25. The institute is equipped with a laboratory and operating rooms.

The SURGEON-GENERAL. Where is it located?

Doctor BRUMBY. At Austin.

Doctor KERR. Unfortunately we did not hear from the Pasteur Institute of Texas.

Doctor BRUMBY. There are from 25 to 30 cases there at all times. There are 27 cases there now. The physician in charge promised to furnish me a report, but his whole time is taken up in his laboratory. He has 27 patients just now, and he makes his own cords which necessarily requires constant attention on his part. In the case of 85 or 90 per cent of the patients a positive diagnosis of rabies was made in the dog or animal offending; 25 per cent were bitten by skunks. There are several species of skunk in Arizona, New Mexico, and western Texas. They are very susceptible to the disease, and the bite of a skunk is said to be ordinarily more serious than that of a dog. Two per cent were very mild cases. The patients had been bitten by dogs, cats, and even a mouse in one instance. The brain of the mouse was sent to the laboratory and was regarded as suspicious. I am pretty sure there is more of the disease in New Mexico than there is in Texas in proportion to the population. I do not know how prevalent it is in Arizona, but in that section of the country there are more skunks.

Doctor HURTY. How do persons come in contact with the skunk?

Doctor BRUMBY. Why, people camping out. Not only in the western section, but in many parts of the eastern section people sleep with open doors and windows.

Doctor HURTY. And the animals stray in and bite them?

Doctor BRUMBY. Yes; at times a person will wake up and find a skunk lying on him. He will drive him off without having been

bitten, and if the skunk is killed quickly it is not known whether it is rabid or not.

The SURGEON-GENERAL. Doctor Fox, have you anything to say?

Doctor FOX. I would like to ask if the Public Health and Marine-Hospital Service has now or has in contemplation the control of anti-rabic virus, as propagated in private institutions.

The SURGEON-GENERAL. If an institution is propagating the virus for interstate traffic it is necessary that an inspection be made of the same.

Doctor PORTER (of Florida). Mr. Chairman, I have had prepared in my office a few statistics relating to this disease in Florida. The first case treated was in February, 1908, the last case under treatment was in May, this statement having been made up to last month. The total number of cases treated was 36, classified as follows: Twenty-six bitten by dogs, showing negri bodies; 6 bitten by dogs that escaped or for other reasons could not be examined microscopically; 1 bitten by a cat proven rabid by animal inoculation; 1 extensively exposed to saliva of a calf showing negri bodies; 1 exposed to saliva of a cow, not examined microscopically but giving a history suspicious of rabies; 1 exposed to saliva of husband who died from hydrophobia. There were 16 treated with cord prepared in the laboratory of the city board of health of New York and 20 treated by cord prepared by the secretary of the state board of health of Georgia. No cases of rabies followed treatment, and no untoward results, except a few abscesses arising from injection during last summer. The youngest case was 20 months old, the oldest about 60 years. The total cost has been $25 per case and $900 for the 36 cases. I will say here that the state board of health furnishes this treatment without cost to the individuals. We have distributed literature on this subject to health boards and carried on correspondence and provided talks to the city councils of Gainesville and Tallahassee, resulting in muzzling ordinances. Lately we have been using virus from the Dr. H. M. Alexander Company, of Marietta, Pa., which furnishes it in vacuum tubes. It has proven very successful, and we were able in that way to have the treatment sent direct to homes of individuals to be administered by private physicians, the state board having a man on hand to see that the treatment is properly started. The individual pays, of course, his private physician for administering it. I thought this might be interesting data.

Doctor WOODWARD. I am glad to know that there are so many recorded deaths from rabies. There has been great difficulty heretofore in impressing the public with the fact that deaths do occur from rabies. Such deaths are distributed over such a wide area that unless collected by some central authority they are not likely to

come to the notice of people in general. I think that a knowledge of the frequency of this disease will go a long way toward solving the problem of prevention. I have had some experience in the enforcement of two muzzling ordinances and I know very well the opposition that exists to their promulgation and to their renewal. My first experience was about twelve years ago when we had an ordinance in force for six months, but at the expiration of that time the personnel of our board of commissioners had changed and the ordinance was not renewed. While probably the occurrence of rabies during that period was limited by reason of the muzzling, yet it is hardly likely that the muzzling was carried on long enough to effect any permanent results. About a year and a half ago rabies was more than usually prevalent, and the commissioners were induced to promulgate an ordinance that was effective for a while. Unfortunately it was not renewed. The difficulty with respect to enforcing a muzzling ordinance is very well illustrated by the difference in the enforcement of the two ordinances I have mentioned. The first ordinance was promulgated largely in the face of public opinion and opposition to it was most vigorous; the second ordinance received a strong support from the public by reason of the greater prevalence of rabies and by reason of the influences that were enlisted in its behalf. As a consequence it was not a very difficult thing to enforce the ordinance last year, while the enforcement of the former ordinance was very difficult. The solution of the problem of prevention is not in the erratic issuance from time to time of ordinances requiring muzzling, but in insisting at all times that dogs on public thoroughfares shall be muzzled. I think this would be an advantage for several reasons. In the first place I think it is more humane than the present system, because a dog brought up to a muzzle is happier than a dog subjected to it for the first time in his old age. Another reason is, that if muzzling was continuously practiced there would be on hand at all times a supply of muzzles suitable to fit any dog, and people dealing in muzzles would be able to fit them. Experience shows now that when a muzzling ordinance is issued there is an influx of muzzles of all kinds and they are sold by dealers of all kinds. A dealer will say: "Why, there are the muzzles, just find one to fit your dog." He does not care to handle the dog himself. There are, therefore, many cases where the muzzles are inefficient, and in many instances they do not fit and cause suffering. In no case has the dog been properly taught to wear a muzzle. I can see no more reason why a man should be permitted to let his dog run on the public thoroughfare, unmuzzled, than to let his cow or horse go there, untethered and unhaltered. I think he should be responsible for either animal. The continuous muzzling of dogs is, I think, the solution of the problem. I am told that the dogs in Germany rather

like it. They like to have muzzles put on because they know that it means freedom for a while. One gentleman told me that his own dog, here in Washington, acquired the same habit.

I have not the figures relative to rabies in the District of Columbia. All the persons bitten and treated in the Hygienic Laboratory were bitten by rabid animals; these animals having been examined by the Bureau of Animal Industry.

Doctor FRANTZ. From whom is it obtained?

The SURGEON-GENERAL. If you will write to the Surgeon-General he will be pleased to give you all information.

Doctor SMITH. What experiments have been made in the direction of immunizing dogs?

The SURGEON-GENERAL. I do not know of anything.

Doctor SMITH. Have you a prophylactic measure? That would offer a good field for experiment.

The SURGEON-GENERAL. I have heard that suggestion, but know of no action taken toward that end. Doctor Stimson, you have been working in the laboratory; can you give any information on that subject?

Doctor STIMSON. There have been suggestions to immunize dogs and more especially cattle, but not on a large scale. I have not heard that they have met with general application. I think it is confined to a few valuable animals that the owners wanted to save. I do not think it was made on a large scale.

Doctor FOX. I would like to know if in these experiments any symptoms of rabies have developed.

The SURGEON-GENERAL. Among the patients?

Doctor FOX. In animals which have been injected for immunity. Because it is asserted by those who oppose the scientific treatment of rabies, that the Pasteur treatment produces symptoms of rabies.

Doctor STIMSON. I do not think that any of these animals have developed rabies from the treatment, but I have not seen the original reports of these experiments.

Doctor HOLTON. With regard to prevention of the disease in our State, we had two cases of rabies last year in animals and one case in a human being. The latter was treated at the Pasteur Institute in New York. We consulted the Attorney-General as to our authority in the matter, and he assured us we had control of any kind of infectious disease. We then issued orders that whereas it had come to our knowledge that an infectious disease known as rabies existed in a dog or dogs in such and such a town that all dogs in that town were ordered to be muzzled or kept in the premises of their owners for ninety days. Instructions were sent to the local health officers to that effect, and if after a certain day any dog was found abroad unmuzzled the health officer was directed to shoot him without any

further notice or warning. There were protests made by some, but they found that they were not heeded; one or two dogs were shot, and we had no more trouble.

The SURGEON-GENERAL. I happen to know in the State of Georgia recently they had some experience with the muzzling of dogs. I was recently in Atlanta and Doctor Harris who is here might give us a statement.

Doctor HARRIS. There has been nothing done, so far as I am aware, in the State. There has been a recommendation by the state board of health and also a resolution by the Georgia Medical Association requesting the legislature to pass an act requiring muzzling, but nothing has been done. The legislature meets in three weeks, and it is quite possible we may succeed in accomplishing something. We are getting along very well with our Pasteur work.

The SURGEON-GENERAL. Shall we discuss the matter of muzzling?

Doctor PROBST. The prevention of rabies is one in which I am personally interested, and Doctor Holton mentions ninety days' quarantine. We have a pet bitch in my own home which was bitten by a stray dog five or six weeks ago. We know nothing about the dog, but from the best information we can get it was a male dog, and a friend of mine told me that a male dog never bites a bitch except when he is rabid. Now, how long should a dog be confined that has been bitten, but which is not positively known to be in any danger?

Doctor SWARTS. If we here can arrive at some general conclusion, we should be able to state that a certain number of days is required for muzzling of dogs after the last appearance of a case, and the number of days necessary to hold a supposedly mad yet valuable dog in quarantine instead of killing for examination. What we agree upon could be utilized for a guide so as to satisfy the authorities who may ask for a release from muzzling.

Doctor BRUMBY. I think we should be very explicit on that point. We should make a distinction between a dog that was found to have been bitten and a dog that is supposed to have been bitten. I think it is best to shoot a dog that is bitten, and we should put ourselves on record against anything but instant death for that dog wherever known to have been bitten. I think Doctor Probst's friend was right. I never saw a male dog bite a slut at any time.

Doctor PROBST. Unless with rabies.

Doctor BRUMBY. Of course, unless with rabies.

Doctor HARPER. In looking over the history of rabies some little time ago I saw an article concerning this disease in England, where they had restrictions for thirty, sixty, and ninety days. Notwithstanding, rabies still persisted, and became prevalent throughout the entire island, and later on in order to eradicate it they issued an order to quarantine all dogs, first a year, and then they extended it

about six months more. By so doing they eliminated rabies from the island. Of course we know in Australia there is no rabies, for they will scarcely allow a dog to go into that island. We have a little easier proposition in the States. We find that the muzzling of dogs is becoming easier because we are losing very valuable animals, cows, and pigs. Our time in the southwest part of the State is pretty well taken up with the rabid animals. A local health board wanted permission to pay a man for 13 pigs that were killed as rabid. We could have 13 cases among children and the board of health would have a hard time taking care of them. Now, that the question of rabies is getting into the commercial world and on a basis of dollars and cents I believe we are going to have an easier time with the persons in the State who oppose muzzling. But local muzzling does not meet the situation. We have direct evidence of a dog suffering from rabies going 25, 30, or 40 miles, following the line of the railroad, and biting a number of people along that line. This mad dog was gotten after by the section hands. There is a squad of section hands every 5 miles. They telegraphed that a dog was coming, and the next squad got after him with picks, spades, etc., and wounded him; some of the fifth line of section men finally captured the dog and the laboratory examination showed that he had rabies. I think the question of eliminating rabies is one not only for a State or locality, but for all the States, and we have to be pretty generally united in our action. One State might eliminate the disease and dogs would come in from other States. I think it should be along the lines suggested by Doctor Swarts. A solution of the problem is coming in time, only it is going to be not only State wide, but universal.

Doctor Bennett. I move, Mr. Chairman, that a committee be appointed to consider the question of muzzling dogs, particularly as to the period of time that should be covered when the dog is suspected at all of infection. At the same time we should be getting more full data regarding the welfare of the different communities in which we live, and States, if this was taken up by a committee.

The Surgeon-General. How would it do for your resolution to read: "To consider the matter of prevention," and that would take in the period of time.

(The amendment was accepted. The motion was seconded.)

Doctor Bracken. I presume that committee is not to report this year.

The Surgeon-General. I doubt if the committee could report this year. But it would be a very profitable work to carry out during the year. They could report upon the matter and it could be brought up next year.

Doctor Bennett. I think to make a thorough examination the committee could hardly report under a year.

(The motion was carried.)

The SURGEON-GENERAL. Shall the committee be appointed by the chairman, Doctor?

Doctor BENNETT. Certainly

The SURGEON-GENERAL. I will name that committee a little later, and if anybody has any suggestions to make as to the personnel of it I would be very glad to receive suggestions.

Doctor BENNETT. I would make a suggestion that the chairman of the committee be appointed from the department—that is, that an officer be selected from the department who is giving special attention to that line of work.

Doctor SWARTS. I second that motion.

(The motion was carried.)

Doctor HURTY. If the subject is not passed I would like to say a word about Indiana. A woman who died at Indianapolis of hydrophobia had a period of eleven months of incubation. So that is one point the committee might consider. We have been trying to make headway against hydrophobia in Indiana and we have concluded that there is not pecuniary loss sufficient to arouse public opinion on the subject. As soon as a few more hundred hogs and sheep and cattle shall have died, involving a loss of $100,000, or more, I think we can get action from our lawmakers. When we presented to our last legislature the fact that there had been a loss on account of rabies of $8,000, they said: "That is not enough to pass a law on at all." When told that 8 human lives had been lost from the same cause, they were not at all impressed. We have local control, only, in Indiana, and at the present time owing to a law passed by the legislature, the state veterinarian and his deputies have power to declare that it is present in any specified area and require muzzling of dogs in the same for a given length of time. The same power is given to local authorities of health, but we are convinced that it is not a local matter and the mere muzzling of dogs in a locality will do no particular good. They may run great distances. We traced one dog across three counties and in each one of those counties he bit several animals, and bit two human beings. Several hundred persons have been treated in Indiana since 1908. At present there are 21 under treatment at Bloomington, which is the home of the Indiana University. There is a corps of physicians in the medical department, but the persons who are administering the treatment have had experience in the state laboratory.

Doctor SWARTS. We have had two or three dogs go over the whole State in Rhode Island.

Doctor BRUMBY. I was somewhat surprised to hear the gentleman say that in Indiana such facts exist. I thought Texas was the only State in the Union where cattle interests were put ahead of the human being. Wolves kill calves and sheep and the cattle interests asked

the legislature this year for $150,000, and they had no trouble getting it appropriated, but the governor vetoed it. If there is a good price for skunk hides we might possibly be able to kill our skunks and wolves, but dogs are another matter. We can get all the money we need for the protection of cattle, and as skunks may be valuable, we may yet be able to get rid of them.

Doctor Lewis. What has been said regarding the value of human life reminds me of a story. During a trial in North Carolina a young lawyer threatened to shoot an older lawyer who was opposed to him, and the judge said:

Mr. Jones, if you shoot Dan Hugh McLain the court will be obliged to fine you one hard dollar.

The Surgeon-General. Gentlemen, the next subject we propose to take up is measures against leprosy in the United States since 1902. You have been informed that the second international congress against leprosy is to be held at Bergen, Norway, August 19, 1909, and at that congress it is hoped that the United States delegates will be able to make a report concerning leprosy in the United States. We have sent out to you in the past few months requests for information with regard to leprosy, and we are now gathering the facts together in order that our representatives may present them to the congress. We solicit your aid in collecting the facts which we have requested. You remember we had a commission in 1902 which investigated the number of lepers in the United States. You also know that there was a bill for a United States leprosarium, contemplated to be established in New Mexico, but it was defeated on the floor of the House. It had passed the Senate, was reported favorably by the Committee on Interstate and Foreign Commerce of the House, but was defeated. There was not very much time for a debate and there was a speech made by the Delegate from New Mexico, who thought it was going to be placed on some government reservation in his Territory. We had that in mind, although it had not been finally decided upon, and there was some constitutional objection raised. The bill called for $250,000. The matter of leprosy in the United States is one of great interest, and I am of the opinion expressed at that time. I thought it was good government policy to establish a place where such cases as could not be taken care of by the States might be taken charge of by the Government. In the meantime there have been two or three state establishments formed. I believe there is one in Massachusetts, two in California, and one in Louisiana; and different States and the District of Columbia have made arrangements for segregating and isolating lepers. I want to call your attention to the progress made by the Public Health and Marine-Hospital Service in the Hawaiian Islands in the matter of investigating cases of leprosy, and best methods of treatment.

As you know, there was a law passed in 1905 for that purpose by the same Congress which failed to pass the national leprosarium bill for the United States. We have finished the buildings necessary for the Leprosy Investigation Station, and they are situated on the island of Molokai. The law reads that whenever the Territory of Hawaii shall turn over to the nation 1 mile square of the settlement which is now set aside for lepers, the Government will erect necessary buildings to cost $100,000. There has also been appropriated $50,000 a year for the maintenance of the institution. The object of the institution on the island of Molokai (most of you know of it, but some may not) is to find the best method of treatment and, if possible, a cure for leprosy. That is the object. Of course, the lepra bacillus is known, and has been known for some time, but the great desideratum is to find an absolute cure for the disease, and the method of its conveyance. We have had Doctor Brinckerhoff there, who was formerly connected with the Harvard Medical School. We had him there as director for several years, and he made some very interesting investigations while the buildings were being erected. Under a decision of the Comptroller it was found we could make investigations not only on the island of Molokai, but at the receiving station in Honolulu, where, under the territorial laws, the lepers are first taken, and where they are given a very careful examination before they are sent to the island of Molokai. The investigations that have been made at Honolulu have been made with cases in the earlier stages. Thus, at Molokai we will have a supply of advanced cases of leprosy and at the receiving stations at Honolulu the incipient cases. Some valuable observations have thus far been made. The remarkable fact about the institution is that it has been founded by the United States Government for the purpose of a continuous scientific investigation, year after year, until the end sought shall have been attained. Now, I do not know of any other government that has ever done anything of that kind. There are governments that have leprosariums, but a scientific investigation which shall be continuous, into the mode of transmission and best methods of treatment, I think, has never been undertaken by any government in the history of leprosy. I regret to state that Doctor Brinckerhoff, who has been doing such valuable work, lost his wife by death, and having a little child, sent in his resignation. He has had associated with him, however, a very skillful officer of this service, who volunteered to take his place, provision for which is made in the law, and Passed Assistant Surgeon Currie has now been made the director of the station, and I am very happy to say, and we were very much pleased to learn, that Doctor Brinckerhoff would continue his association with the investigations. He did not want to continue in charge. We have nominated him assistant director of the station, and we shall

continue to have the benefit of his experience, and shall have lost nothing. The question of leprosy is brought up at this time in view of the coming congress in Bergen, Norway, and we would like to have a short discussion of it. Perhaps it would be well to have the discussion deal with the attitude to be taken regarding the isolation of lepers and the desirability and necessity of a national leprosarium. The bill previously referred to was drafted on these principles, and it was the subject of a great deal of discussion. I went to Senator Harris, who is an able constitutional lawyer, and got his opinion. He stated he would not have anything to do with it, as it was unconstitutional. Time went on, and, at any rate, views on the Constitution do change, and having talked with two or three men very learned in the law, I received some aid. The bill which was drawn was based upon the principles that the National Government should establish a place where these lepers could be taken care of when turned over by the State, but the National Government would have to designate some one to receive the body of the leper, and each State would have to have a corresponding officer, such as secretary or president of the state board of health, authorized to turn over to the receiving officer of the National Government the person of the leper. That would leave it for each State to determine whether it would send its lepers to a place established by the National Government or care for them within its borders. A good many cases of lepers have been brought to our attention, but of course without that law we have not been able to furnish any relief, and the States are now expected to take care of lepers as they find them. Before calling for any remarks from the other gentlemen present it would be well to hear from the delegate from Hawaii on this subject. The board of health of Hawaii have requested that Doctor Cofer, an officer of our service, and now assistant surgeon-general in the bureau, represent them here. Doctor Cofer was for seven or eight years in charge of the national quarantine in the Hawaiian Islands, and for a considerable period of time, by request of the territorial health authorities, assisted the territorial board of health. He was also president of the board of health of Hawaii for a time, and is perfectly familiar with the situation there. I shall ask him to give a brief statement.

Doctor Cofer. Mr. Chairman and gentlemen, it is surprising that only this morning I should have received a copy of the new act relating to leprosy which has just been approved by the governor of Hawaii, April 14. It may be said to be the last word in the matter of an act for the segregation of lepers and the control of leprosy, and marks a new epoch in the management of leprosy in Hawaii. This act was prepared after a great deal of labor, and a great deal of

diplomacy had to be exercised in getting the natives to agree to it, many of the members of the legislature of Hawaii being natives. It is pertinent to outline to the conference the reasons which led to the passage of this act. Under the old law lepers were apprehended for examination, not only by reports from physicians, but as a result of any information concerning persons suspected of having the disease. At times persons were reported through spite, and while persons so reported were frequently found afflicted, the system which admitted of such general application was found to engender a great deal of antagonism, with the result that many cases were hidden by friends or relatives, who sought to protect the lepers from what they believed to be a too hasty diagnosis with a consequent banishment to the settlement on the island of Molokai. Thus the cause of segregation was greatly injured, only the more advanced cases of leprosy being reported or discovered, while the mild cases, which are believed to be the most infectious, being undiscovered, were allowed to remain in their homes, unconsciously infecting others. Finally leprosy began to become a political factor, and through various interpretations of the law, or through political influence, the territorial board of health was further hampered in its endeavors. The Surgeon-General has mentioned the work the United States Public Health and Marine-Hospital Service is doing in the Hawaiian Islands, and particularly the work being carried on at the present time in Honolulu. It was necessary, however, for a law to be passed by the legislature of Hawaii in order that special investigations could be carried on, not only in Honolulu, but in the other parts of Hawaii as well, with a view of discovering early cases of leprosy. I will read extracts from the new act which I have just received from Governor Frear, of Hawaii. The plan on which this act is based was that found by experience in Norway to be very effective. Norway had for many years made it such a hardship for a family to have a case of leprosy in its midst that it was only human for friends and family to delay the discovery of such a case as long as possible. It is believed that leprosy in its incipient stage is more infectious than in its later stages. We have all seen many advanced cases where there was no evidence of bacilli being thrown off. This is acknowledged practically everywhere. Such men as Professor Koch claim that these cases are not dangerous to the public health, but on account of their being paupers and on account of their repulsive appearance it was only humane to take care of them in some isolated but comfortable home or settlement. In Norway hospitals were established in every town where the cases could be cared for and their relatives could go to see them, so that an inducement was offered to a leper to deliver himself for treatment, as against the obsolete plan of expecting a leper to submit at once to

banishment from his friends or, in other words, to consign himself to a living death. The act is as follows:

[Act 81.]

AN ACT Providing for the care and medical treatment of persons afflicted with leprosy.

Be it enacted by the legislature of the Territory of Hawaii.

SECTION 1. *Hospital.*—There shall be established at and on such place on the island of Oahu, Territory of Hawaii, as the governor shall direct, a hospital for the care of persons afflicted with leprosy, there to receive such treatment as shall be provided or approved by the board of health.

SEC. 2. *Treatment at hospital.*—At such hospital every reasonable effort shall be made to effect a cure of the patients, and such patients shall be cared for as well as circumstances will permit and given such liberties as may be deemed compatible with public safety. They shall be treated by such licensed physician or physicians as the board shall designate, but if any patient so prefers, he may be treated at his own expense by a licensed physician of his own selection under such conditions as the board may prescribe. Any person may, at any time, secure free of charge at such hospital an examination for the purpose of determining whether or not he is a leper, and in case he is found not to be a leper the board shall upon request furnish him with a certificate setting forth such fact, the date of examination, and the name or names of the physician or physicians making such examination.

SEC. 3. *Notification.*—Every person who knows, or has reason to believe, that he, or any other person, not already under the care or control of the board of health, is a leper, shall forthwith report to the board or its authorized agent, that fact and such other information relating thereto as he may have and the board may require.

SEC. 4. *Examination.*—Any person so reported, or otherwise believed to be a leper, may be examined at any time and place and by any physician or physicians that may be agreed upon by him and the board or its agent.

The board or its agent may, however, instead request such person to appear at a designated time and place not less than five days thereafter and then and there to submit to an examination by a designated physician for the purpose of ascertaining whether such person is a leper.

If, however, such person prefers such examination to be made by more than one physician, he may so notify the board or its agent at any time before the time so designated and may at the same time, or within such further time as the board or its agent may allow, designate to the board or its agent one licensed physician, in which case the board or its agent shall within five days thereafter designate to such physician a second licensed physician and at the same time so notify such person and such second physician, and the two physicians so designated shall within five days thereafter designate to the board or its agent a third licensed physician, and if they fail to do so, such third physician shall be designated by the circuit judge of the circuit in which the examination is to be held and in the case of the first circuit by the first circuit judge; and in case such person shall fail to designate a physician within the time allowed, all three physicians shall be designated by such judge; notice of any such designation or designations by a judge shall be given forthwith to such person and to the board or its agent; when the three physicians have been so designated, such examination shall be made by them or a majority of them at a convenient time and place designated by the board or its agent, reasonable notice of which shall have been given by the board or its agent to such person and such physicians. The physician or physicians who make the examination shall report to the board or its agent whether in his or their opinion such person is a leper.

If such person is under the age of sixteen years, his parent or guardian, if any, may exercise such preference and thereafter represent such person as far as may be for the purposes of this section.

If upon such examination such person is found not to be a leper, the board shall furnish him. upon request, a certificate setting forth such fact, the date of examination, and the name or names of the physician or physicians making the examination.

SEC. 5. *Transfer to hospital.*—If upon such examination such person is found by such physician or physicians or a majority of them to be a leper, he may be transferred by the board or its agent to such hospital. If he shall refuse or fail to appear and submit to any such examination at the time and place designated or agreed, he may be arrested and taken to such hospital upon a warrant issued by any circuit judge or district magistrate upon a sworn complaint setting forth the necessary facts and shall there be examined as near as may be as provided in section 4 of this act. All lepers at such hospital shall remain in the custody of the board and its agent until lawfully discharged or removed by its direction or permission.

SEC. 6. *Removal to settlement.*—Any leper may be removed from such hospital or any other place to the leper settlement at any time with his consent, but no leper shall be so removed until he has been at such hospital for at least six months unless, in the opinion of at least three licensed physicians. he can not be materially benefited by further treatment there, provided that any leper whose custody it has been necessary to obtain by arrest or who is unwilling to receive such treatment or to submit to such rules and regulations as the board may approve or prescribe may be so removed at any time. When so removed he shall remain in the custody or control of the board until lawfully discharged.

SEC. 7. *Discharge.*—Any person detained as a leper, whether at the hospital or at the settlement. shall be released whenever the board shall be satisfied in any way that he is not a leper. Upon the request of any such person at any time not less than one year after any previous examination, he shall be examined by three licensed physicians, to be chosen in the manner provided in section 4 of this act. A decision by a majority of the examining physicians that he is not a leper shall entitle him to a discharge.

SEC. 8. *Expenses—Rules.*—The board shall bear all expenses of travel and other necessary expenses incurred under this act, and may prescribe all rules, regulations, and forms, and perform all acts necessary and proper for carrying out its provisions.

SEC. 9. *Penalty.*—Any physician or police or other officer who shall violate the provisions of the third section of this act shall be liable to a penalty of not more than one hundred dollars, and in addition thereto, to forfeiture of his license to practice, or to removal from office, as the case may be.

SEC. 10. *Repeal.*—Sections 1122 and 1122A of the revised laws and act 122 of the laws of 1907 are hereby repealed.

SEC. 11. The sum of forty thousand dollars is hereby appropriated out of moneys in the treasury received from the general revenues for a hospital to be erected under this act.

SEC. 12. This act shall take effect upon its approval.

Approved this 14th day of April, A. D. 1909.

I believe that in the future Hawaii is destined to be an important contributor to the literature of leprosy, for the reason that both the board of health of Hawaii and the Public Health and Marine-Hospital Service now have a definite basis on which to work. There are at present in Hawaii two homes, one for the custody of the nonleprous girl children of leper parents, and the other a home for nonleprous boy children of leper parents; so that at present there are, all told, about 125 children of lepers who have so far not shown symptoms of leprosy, and with the date of exposure known, should they ever show signs

of leprosy, the incubation period may be established with certainty. The subject of leprosy in Hawaii is inexhaustible, and I regret that even in touching upon it I have consumed so much time.

Doctor BRUMBY. What is the method of conveyance—what does carry it? I think it is the theory—I think it was the theory at one time that the itch mite carried the disease.

Doctor COFER. The abrasions of the skin caused by the itch mite could be classed as one of the possible factors in the inoculation of the virus of leprosy.

Doctor PROBST. What is the penalty for violation of the act? How about people who have no property?

Doctor COFER. That question came up once before, and there was purposely no penalty attached, but the idea was to get a public sentiment, which this shows has been gotten, and I do not believe that there is any need of enforcement. I think there was one more question. I can not answer for the itch mite, but that can be answered in a group with the other questions as to the part the mosquito plays, and various other insects and vermin. This answer will be that any of them can possibly be the means or medium, but there is as yet no direct evidence to that effect. The present idea is that the infected nasal secretion and close housing of that class of people, which is unusual for a warm country, is the cause of leprosy; that these people have the bacilli in their noses and sneeze them around in close quarters with other lepers, and the disease is so spread.

Doctor BENNETT. I think all of us must feel very gratified to think that our nation is making the first continuous scientific investigation into the discovery of the cure of leprosy. I was particularly interested to hear the Doctor's remarks about Hawaii, because I remember that when I was in Hawaii twenty-two years ago, on my way to China, and asked with regard to reporting of names of suspected lepers, I was told that names were sometimes reported as a matter of spite, and I am very glad to hear of the care which is now being taken to determine whether these people are lepers or not. Regarding the responsibility of the State for lepers, in Colorado we have twice or three times in the last eight years had to face that trouble. As recently as two years ago we had to consult with the Surgeon-General regarding what we should do with a Japanese leper that was discovered in Las Animas County. I went down there on the request of the authorities and examined this man and was convinced to the best of my ability that it was an undoubted case of leprosy. That man we put in charge of the sheriff, and for the protection of the State isolated him in the coal camp where he was then, and while waiting word from Washington to know what we should do (and I must say we received reply as quickly as possible) one morning the

sheriff informed us that the patient had escaped. We made investigation regarding that case, and traced him to many places, to Sacramento and then to Nevada, and I found on investigation that this man had been driven from one coal camp to another by his own people. Report came to me from Denver from a Japanese there that they did not want him around. They knew that he had leprosy, and the remarkable part of it is that this man had traveled from State to State—I do not know how far he had gone. Since he is out of Colorado we do not care, but we ought to. We certainly do not want lepers from your State, and you do not want them from ours. I hope there will be some measure adopted by the United States Government which will definitely define to the state authorities what they are to do regarding these cases and the prevention of their passing on to other States—if a State has to take care of a victim of this disease.

Doctor SMITH. Just a word in regard to our lack of knowledge of the definite method of communication of this disease. I want to mention one Chinatown, and perhaps Doctor Wills will be able to give some information. In our Chinatown in Portland, Oreg., we have for the past twenty years had dozens of leprous Chinamen in all stages of the disease, some of whom have lived in the densest part of the Chinese section of the town and never yet infected their fellow-Chinamen. This recalls the fact that Kaposi, in his writings, as far as twenty years back, held that the disease was not ordinarily communicable, and to demonstrate his belief he had one of the most repulsive and advanced cases walking freely about in one of his wards.

Doctor BRUMBY. We have recently had some leprosy in Texas. Forty thousand dollars have been set aside for a leprosarium, and it falls to me and the county health officer to pass upon the cases as to diagnosis; then it devolves upon the sheriff of the county in which he resides, to see that he is carried to the leprosarium.

The SURGEON-GENERAL. Have you established an institution?

Doctor BRUMBY. No, not yet. It will be done in the fall I think. Money is now available.

The SURGEON-GENERAL. Have you got a site selected?

Doctor BRUMBY. No, sir.

The SURGEON-GENERAL. If you have, you are not mentioning it.

Doctor BRUMBY. Not just now. Did I understand you to say, Mr. Chairman, that $100,000 was available to build an institution?

The SURGEON-GENERAL. Yes; on the island of Molokai.

Doctor BRUMBY. And $50,000 for investigation and research?

The SURGEON-GENERAL. Yes; $50,000 for maintenance; it is a research place.

Doctor BRUMBY. Don't you think we ought to have a place in this country too? The further we send them the better for the patient and the public. And if we had such an institution—a government institution—we might send our lepers there and that might be better than establishing such an institution in Texas. For instance, if we had such an institution in Indiana we would have no trouble. We could just send all our lepers there.

Doctor BRACKEN. Why could not Congress be persuaded to provide a leprosarium for the District of Columbia? This would be the entering wedge. I believe it would be easy to send leprous patients from the various States to such a place if it were provided and authority given to take care of lepers from States as well as from the District.

Doctor WOODWARD. So far as the District of Columbia is concerned the only objection would come from real estate interests. I doubt very much if any community in the world, upon finding in its midst such a patient, has raised hundreds of dollars for him by public subscriptions, as they have for our leper here. I think that speaks highly for our public spirit. I think one gentleman in New York has been stirred up pretty strongly. Washington has been calm and quiet. We had to put guards about our patient to keep people away from him.

Doctor WILLS. I confess I know very little about leprosy, but I do think there is a great deal more fear than is really necessary.

Some years ago the city council of Los Angeles built a very expensive and elaborate detention hospital in a secluded section of the city, and in these hospital grounds they frequently have a case or two of leprosy and no one is alarmed. We are a great deal more concerned about tuberculosis than leprosy.

There is a leper colony of a dozen cases or so, somewhere near the Cliff House in San Francisco, on the ocean front.

I think the newspapers are responsible for much of the excitement about leprosy. I think the board of health of the city of San Francisco, and the California state board of health, would agree to care for lepers, provided their expenses were guaranteed by States from which they come. I believe its contagiousness and communicability, man to man, has been much exaggerated. It seems to be a Hawaiian disease from eating poi and bad fish.

Doctor HOLTON. You have some at your poorhouse?

Doctor WILLS. We had one at the county hospital for a long time.

Doctor HOLTON. I saw about a dozen when I was there.

Doctor BRACKEN. I wish to speak against this hysteria concerning leprosy. Minnesota has its share of lepers, but there is no hysteria in that State over this fact. The lepers live at home if they have homes. It was claimed a few years ago that there were no American-born lepers in Minnesota, but I now know of three born in that State.

If there were a place where lepers could be sent I think it would be very easy to send them there and keep them in such an institution. I am sure that the friends and sanitary officials in Minnesota would be only too glad to provide for the Minnesota lepers in a national leprosarium. In Minnesota leprosy is handled the same as any other transmissible disease.

Doctor WILLIAMS. This disease is one of extreme interest in South Carolina at present. Not many weeks ago a leper was discovered in one of our towns—the victim being one of the best women of the State, who contracted the disease while a missionary in Brazil. The local board of health issued orders at once that she be removed to a house in the suburbs and there isolated. Her relatives did not like this procedure and applied to the courts, which enjoined the board from moving her. The board appealed to the supreme court, and our state board is naturally interested in what will be the outcome, for we have four other cases in the State. We have had leprosy in South Carolina for years. Nothing has ever been done to prevent its spread, and to-day we do not know of as many cases as we had in 1905. I am informed by one of our best physicians that in 1905 there were seven cases in Charleston, and at present he knows of only two. Nothing has ever been done to prevent the spread of the disease there further than when the diagnosis becomes so patent that it can be made by the laity the victims lead a more or less secluded life. This would, indeed, look as if certain localities are more or less immune or that the disease is very, very slightly contagious. I am not arguing that nothing should be done with these cases, for I believe that all cases should be segregated. We all must admit that it is contagious to some extent, and this fact would, I am sure, make all of us unwilling to live with a leper, and if we are to apply the golden rule we, as health officers, should not put ourselves on record as allowing others to do things we ourselves would not be willing to do.

Doctor WILLS. There is a great deal of hysteria among the public press. We are much more afraid of tuberculosis.

Doctor PROBST. I recently had a letter from health authorities at Ashtabula informing me of a case of leprosy who had lived in that town for fifteen or sixteen years. I told them if they wanted a lot of trouble we could examine him and make the case public. The newspapers make a lot of trouble. Of course, the health officer was instructed to visit the family and instructions to be carried out were given him, as in Minnesota. There were two cases of leprosy that Doctor De Schweinitz examined in Ohio. No precautions were taken and there was no spread of leprosy. I am glad to see that the United States Government is going to this expense for looking up the cure and taking care of lepers, and I only hope that that may lead to the

United States taking up some diseases that are important to the public health.

Doctor FRANTZ. While we are not troubled with leprosy in this country as much as they are in some foreign countries, yet I feel as the health officer that a case of leprosy occurring in the State of Delaware (I am glad to say we have none there now) should receive as active measures of segregation and care as any other communicable disease. The trend of the remarks is minimizing the importance of leprosy, and as health officers the influence on the public of these remarks as to the harmlessness, etc., of leprosy will have a baneful effect upon the public at large. I think if we, as a body, should say of leprosy, after all these years, "it is nothing at all," that that would be a very bad thing to do. Many will say just the same of smallpox: "It is nothing but the itch." So that I say if the popular impression the people at large have as to leprosy—if we continue it—will be for the benefit of humanity in the other diseases which are more contagious than leprosy itself. I think, as physicians, we are not so much afraid of smallpox, of diphtheria, or other communicable diseases, but I do think we should continue to encourage the sentiment of fear on the question of leprosy as it is going on to-day, that we should not minimize the importance of an outbreak of leprosy the country over. While we are at present, it is true, very free of it, we do not know what twenty-five years may bring forth in the question of leprosy. We have it in our largest cities, in Philadelphia, in New York, and in Washington, and also in mining camps and such places, and we may have more outbreaks. I would rather live next door to a leper sanitarium than I would in some house or place where a leper had lived and received no care. The reason that leprosy is not spread more than it is is because the leper is kept away from his fellow beings.

Doctor PROBST. Is it not a fact that the New York state board of health is not quarantining their cases of leprosy? I have seen cases in the hospitals there that I do not think were quarantined.

Doctor BRACKEN. I heard that if one of their inspectors reported a case of leprosy they would discharge that inspector.

Doctor WOODWARD. There are two lepers in this country who were soldiers in the United States army, who presumably contracted the disease in the Philippines. Now, it is not likely that they were exposed to any great extent for any length of time, or in crowded quarters with lepers. How did they get it? If the two or three cases in Minnesota are natives there is evidence that it can spread.

Doctor FRANTZ. My remarks were directed more on the line of popular education; what impression is given the people. I do not think that leprosy is as bad as smallpox or some other diseases; but

if a leper comes into the State of Delaware I believe that the people at large will have a good deal more respect for the health authorities if they take some sort of action with regard to the matter.

Doctor BRACKEN. That is the very reason for urging that the Federal Government should undertake the study of leprosy, as suggested in the Hawaiian law.

The SURGEON-GENERAL. I have always had the belief, and I still cling to it, that leprosy should be segregated. Of course it might, in certain cases, be cared for as it is in Minnesota; but there are a number of lepers that are charity cases, and out of charity to them there should be some place provided where they can live well and where humanity may manifest itself toward them kindly. There is something due to the lepers themselves, and more than that—my observations, while they have not been extensive, lead me to make the assertion that where lepers are segregated, so far as is possible, the disease can be diminished in a country, or in a State, or community; but if neglected absolutely there is no qestion, in my mind, but that the disease will spread. This belief has been impressed upon me particularly by reading the reports which I have received from the officers of our service in foreign countries. I had to delete from my annual report what Passed Assistant Surgeon Cumming reported regarding the disease in Japan. There are a great number of lepers in Japan and some of the South American republics. The reports coming from some of these countries where the disease has been neglected are appalling. Leprosy has always been there, is spreading, and something should be done. This influenced me in endeavoring to get a national leprosarium established, and if we could still get something of the kind it would relieve the situation some. No hard and fast rule should be made for every leper in the United States but an institution that would relieve the situation and prevent the spread, or have a tendency to prevent the spread of the disease, would be a good thing. We may be able to bring that matter up again some time; but in the meantime there is nothing to do but to take care of leprosy in the States. The National Government can not take care of lepers at present. We tried to get the law, but could not do so.

Doctor HOLTON. We have here, Mr. Chairman, the secretary of the state board of health of Massachusetts. You know, sir, that Doctor Harrington passed away during the year. I have the pleasure of presenting to you Doctor Richardson, his successor.

Doctor RICHARDSON. I regret to say that I am, as yet, unfamiliar with the exact situation as regards leprosy in Massachusetts. I understand, however, from the board of charity, which has charge of persons suffering with this disease, that there are now under treatment, on the island of Penikese, 12 cases of leprosy, whereas, in 1904, there were no lepers whatever in the State.

Doctor PORTER, of Florida. Will this subject be continued when we meet this afternoon? I think it is a very important one. I do not think we have heard quite enough from several of the members. I have a little to say on it myself.

The SURGEON-GENERAL. Yes; but it is necessary to adjourn now. We are going to meet the President.

(The conference here took a recess, at 12.40 p. m., until 2.30 p. m.)

AFTERNOON SESSION.

The conference was called to order at 3 p. m. by Assistant Surgeon-General Kerr.

The TEMPORARY CHAIRMAN (Doctor Kerr). The Surgeon-General asked me to state to the conference that he has an important engagement and will be delayed, and instructed me to call the meeting to order and resume the discussion of leprosy. If there is any member of the conference who has any remarks to make we should be pleased to hear them.

Doctor BRACKEN. There is one thing that we ought to do at this conference, and that is put ourselves on record as in favor of an institution for the control of lepers.

Doctor SWARTS. You mean in the United States?

Doctor BRACKEN. Yes.

The TEMPORARY CHAIRMAN (Doctor Kerr). Perhaps it might be well to bring up the subject again with a view to discussing the advisability of passing a resolution.

Doctor BRACKEN. We might frame a resolution and have it introduced later if agreeable.

Doctor SWARTS. I move that a committee of three be appointed by the chairman.

The TEMPORARY CHAIRMAN (Doctor Kerr). There is another committee to be appointed, and I shall bear in mind the motion regarding this committee, and both committees can be appointed at the same time.

The next subject on the programme is the investigation of typhoid fever. Typhoid fever has been the subject of extensive study in the District of Columbia by a board of officers appointed by the Surgeon-General for that purpose July, 1906. It was thought that this subject would be of interest to state health officers and it was included in the programme, with the view to outlining very briefly the methods adopted for the study of the disease here, and more briefly the results thus far obtained. It was also thought to emphasize again the fact that typhoid fever is a universal disease, that its prevention is a national problem; that it is deserving of careful study all over the country, and that there is no other disease, probably, of so much importance, especially to health officers, at the present time, with the

possible exception of tuberculosis. The acting chairman of the typhoid board, Passed Asst. Surg. L. L. Lumsden, who is now stationed at the laboratory, has been asked to present some remarks on the subject as it has presented itself to the board since July, 1906. We shall call on Doctor Lumsden.

Doctor Lumsden responded by reading the following communication:

EPIDEMIOLOGIC STUDIES OF TYPHOID FEVER IN THE DISTRICT OF COLUMBIA.

By Passed Asst. Surg. L. L. Lumsden, U. S. Public Health and Marine-Hospital Service, Washington, D. C.

As typhoid fever is so prevalent and so widely disseminated throughout the States and Territories of this country, as the measures to prevent the spread of the infection of this disease are generally so well known and yet frequently so difficult to administer as laxity in the administration of preventive measure in one State or Territory may cause outbreaks in other States or Territories, the prevention of typhoid fever presents itself as an acute inter and intra state problem, which very aptly is considered at conferences of state and territorial health officers with the Public Health and Marine-Hospital Service of the United States.

In recent years the generally accepted view has been that typhoid fever is an infectious disease caused by a specific organism, the typhoid bacillus. The elements of mystery now remaining concern the mode of transmission of and individual susceptibility to the infection.

Typhoid fever is frequently referred to as a "filth" disease, but the general belief now is that only filth into which the specific infection has been introduced can cause the disease. In other words, filth serves as a vehicle of transmission but not as a source of origin for the infection.

All known facts on the subject support the view that man is the permanent host of the parasitic organisms which cause this disease, and if their multiplication in and their dissemination by the human host could be prevented, these organisms would soon perish from the earth. Therefore, what appears to be a sound belief, based on epidemiological findings, is that "each and every case of typhoid fever comes somehow from some previous case."

This would seem to give us the cue for preventive measures—to destroy the infection as it leaves the bodies of infected persons. To the inexperienced this may seem a simple formula and one easy to apply, but the practical sanitarian knows that many difficulties beset its application. The people in a given community may use water, milk, and various foodstuffs obtained from a distance and liable to contamination with the discharges of typhoid-fever patients over whom their own health officials have no jurisdiction. Many cases are not recognized or not reported until there have been many chances for the infection to have spread from them. Therefore for the health officer the two principal plans of action in the prevention of typhoid fever in his community are:

1. The discovery of and the prevention of the spread of infection from persons in his community who harbor the infection.

2. The prevention of the introduction of the infection into his community from without through various channels, such as the water supply, the milk supply, and the general food supply.

In order to carry out a successful campaign against the disease, it is necessary to know the principal immediate sources of the infection and to determine these careful epidemiologic studies are necessary. In explosive outbreaks, such as those produced by highly infected water or milk, rather characteristic features are presented and as a rule epidemiologic studies of these will point out quite readily and definitely

the source of the infection; but in communities where a high rate of prevalence of typhoid fever is maintained for years and is due to a number of different factors which vary in relative extent of operation from time to time, the problem becomes very intricate and its exact solution exceedingly difficult. Such a problem confronts us in Washington and in many of our other larger American cities.

During the past three years a board of officers, detailed by the Surgeon-General of the Public Health and Marine-Hospital Service, has been engaged in the study of the origin and prevalence of typhoid fever in the District of Columbia. As a member of the board, my official duty during these three years has consisted almost solely of work on this typhoid-fever problem.

I shall now endeavor to outline briefly some of the peculiar features of the typhoid-fever problem in Washington, our methods of studying it, and some of our findings.

The high rate of prevalence of typhoid fever in the District of Columbia has long been a matter of concern to the inhabitants. Previous to the improvement of the public water supply by sand filtration, in October, 1905, numerous investigations of the situation were made by eminent sanitarians, and there was quite a general consensus of opinion among the investigators that Washington's high typhoid-fever rate was due to the polluted water supply obtained from the Potomac River. From time to time engineering projects to improve the quality of the water, such as the construction of subsiding basins, etc., were recommended and carried out. Such sedimentation of the water as was accomplished, however, did not succeed in sufficiently clarifying the water, nor in markedly reducing the typhoid-fever rate. Congress, therefore, acting on the advice of a number of the country's most expert sanitary engineers and sanitarians, provided for a further improvement of the water supply by means of slow sand filtration, appropriating for this purpose the sum of $3,468,405.

The filters were constructed under the supervision of officers of the Engineer Corps of the United States Army, and were completed in October, 1905. Since then the city has been supplied continuously with filtered water. During the winter and spring months following the installation of the filters there was comparatively little typhoid fever in Washington, but early in July, 1906, there occurred a great increase in the number of cases, and the disease was properly regarded as prevailing in epidemic form. This marked increase in the prevalence of typhoid fever with the advent of summer weather corresponded with the history of the disease in many previous years. The recurrence of the disease at the usual rate, or even in excess of the usual rate, despite the improved water supply, was a keen disappointment, both to the medical profession and to the general public, as it had been expected and assurances had been given that sand filtration here would greatly diminish the disease, as it had done in other cities.

The health officer of the District, Dr. William C. Woodward, found himself confronted with an unusual and a difficult situation, and at his instance, the Commissioners of the District of Columbia requested the Surgeon-General of the Public Health and Marine-Hospital Service to cooperate with the health officer in making a study of the subject. In accordance with this request, the Surgeon-General detailed a board of officers to convene on July 2, 1906, for the purpose of making an investigation of the origin and prevalence of typhoid fever in the District of Columbia. This board consisted of M. J. Rosenau, director, Hygienic Laboratory, chairman; L. L. Lumsden passed assistant surgeon; and Joseph H. Kastle, chief, Division of Chemistry, Hygienic Laboratory, recorder.

We have now been engaged in the study of this problem for three years. The results of our studies in 1906 and 1907 are published in Hygienic Laboratory Bulletins Nos. 35 and 44, respectively, and the results of our studies in 1908 are now in press. In conducting this investigation we have considered and studied every factor which we have thought could possibly have to do with the transmission of the infection of typhoid fever. The investigations have included a sanitary survey of the Potomac

watershed; chemical and bacteriologic examinations of hundreds of samples of the city's water supply; a special study of the pumps, wells, and springs in the District and of bottled waters sold in Washington; inspections of the dairies and laboratory examinations of the milk supply; inspections of the ice factories and chemical and bacteriologic examinations of samples of the ice, as well as of the water from which the ice was made; the making of blood cultures, Widal tests, etc., to aid in the diagnosis of doubtful cases; examinations in the Division of Zoology of the Hygienic Laboratory of 200 specimens of feces from typhoid patients to determine the relation of animal parasites to susceptibility of human beings to typhoid fever infection; a house-to-house canvass of 32 city blocks, having a population of over 5,000, with a view to determining what proportion of typhoid fever in Washington is unrecognized or not reported, and also to collect data as to the sanitary condition of residences, and the water and food supply of the general population. In making this intensive study of certain city blocks, over 1,000 specimens of feces from persons in health or with illnesses not suspected to be typhoid fever, were collected and examined for the presence of the typhoid bacillus. This was done with a view to determining what proportion of the population harbors and perhaps disseminates infection without having the disease in recognizable form. The bathing beach and public markets have been inspected from time to time, and the question of shellfish, fruits, and vegetables in relation to the disease has been given attention. A study of house flies as possible carriers of infection has been made and their seasonal abundance considered in connection with the seasonal prevalence of typhoid fever.

An exhaustive epidemiological study has been made of the cases reported to the health office in the District of Columbia during the typhoid seasons of the three years as follows: June 1 to November 1, 1906, 866 cases; May 1 to November 1, 1907, 675 cases; May 1 to November 1, 1908, 679 cases; January 1 to date, 1909, about 240 cases; making a grand total of over 2,400 cases. The collection of the data regarding the individual cases has been done each year by the same officer (Lumsden), so that differences in findings between any two of the three years we believe may be attributed to differences in the conditions—the factors of personal equation not having varied.

The data in regard to each case are obtained by a visit to the residence of the patient and a sanitary inspection of the premises. The patient himself, or, when his condition does not permit of it, some other member of the household familiar with the patient's habits is interviewed in regard to food and drink used, direct or indirect contact with previous cases, and all other facts which can be ascertained which may throw some light on just how the infection was contracted by that individual case. In conducting such an inquiry it is necessary to exercise great care and patience and to avoid as much as possible the asking of leading questions; otherwise erroneous and therefore misleading statements may be obtained.

In this study of the cases in 1906 the blank form on pages 40 and 41 of Hygienic Laboratory Bulletin No. 35 was used, and in 1907 and 1908 the blank form shown on pages 13 and 14 of Bulletin No. 44 was used. In some instances several visits to a house are necessary before all the data for a given case can be obtained.

As the work progresses the case cards are frequently reviewed, so that if any possibly responsible factor is common to a group of cases the fact may be discovered early and the possible exposure of subsequent cases to the same factor looked out for. By this means an outbreak due to infection in milk supplied by some particular dairyman may be recognized, or at least strongly suspected, frequently at its very beginning.

The cases are chartered on a street map of the city, pins, each with the number of the case attached, being stuck in to indicate the places of residences of the cases when the infection was presumably contracted. By means of this map the geographical distribution of the disease can be followed and the grouping and sometimes the relation of cases to one another discovered.

If in the course of the investigation of the case the facts suggest the possibility of some member of the household being a bacillus carrier, effort is made to obtain specimens of feces and urine from such persons for bacteriologic examination. If we find that other members of the household have had typhoid previous to the case under investigation we usually endeavor to obtain specimens. We have recently discovered a house outbreak in Washington apparently due to a carrier. The family consisted of a mother, a son, and three daughters. The son had typhoid in October, 1908. Subsequent to his attack the three daughters developed typhoid as follows: One in December, 1908; one in January, 1909; and one in February, 1909. In March specimens of feces and urine were obtained from the mother and from the son. The son's urine was found to be teeming with typhoid bacilli, the number being apparently about equal to that of a twenty-four-hour broth culture of the organism. Treatment with urotropin was begun, and within about four weeks the urine became free of typhoid bacilli. This man at the time of the investigation was employed as a laborer with a large number of men at the Washington Navy-Yard. Had his condition not been discovered and treatment given he might have continued to spread the infection for many months or even years.

As the results of our studies in 1906 and 1907 have already been published, and as those of 1908 are soon to be published, I shall refer to them but very briefly and limit the reference mainly to the three factors usually most concerned in the transmission of typhoid infection, viz, water, milk, and contact.

Water.—The typhoid fever case rate and death rate in the District of Columbia were lower in 1907 and 1908 than in any other years of which there is record. The death rate per 100,000 of population in 1906 was 49.3; in 1907, 34.5; and in 1908, 36.5. These represent the death rates for the first three years after the filtration of the public water supply. The average typhoid death rate for the three years immediately before the filtration of the water was about 44 per 100,000, and for the three years 1900, 1901, and 1902 about 68 per 100,000. The reduction in the rate in 1907 and 1908 is accounted for by the reduction in the summer typhoid. The rates in the fall, winter, and spring seasons of the three years 1906, 1907, and 1908 were almost exactly the same. An important question and one difficult to answer positively is how much of the reduction in the typhoid fever rate during the summers of 1907 and 1908 was due to the improvement in the water supply as the result of the sand filtration. Had such a reduced rate been observed in the summer of 1906, the first summer after the filters were put into operation, there would probably have been few, if any, who would have doubted that the reduction in the summer typhoid had been accomplished by the improvement in the water supply. In 1906, though, the rate equaled, or even exceeded, the rates of the several years previous, despite the fact that the results of bacteriologic analyses of the water showed that the filtration effected a very great reduction in the bacterial content of the applied water, such as was supplied the city during the three years previous to filtration. Judged by bacteriologic standards, we found the filtered water supplied the city during the typhoid seasons of 1907 and 1908 was of considerably better quality than the filtered water supplied the city in the season of 1906. The reduction in the typhoid rate during the last two years following the higher degree of improvement in the filtered water to my mind suggests cause and effect.

As a board we have not been able to decide definitely as to what part water-borne infection played in the causation of typhoid fever in Washington in 1906, but we are satisfied as the results of our studies that the Potomac River water previous to filtration caused much less of Washington's typhoid than was generally supposed, and that in the typhoid seasons of 1907 and 1908 the public filtered water supply played a relatively minor rôle, if any, in the causation of the disease.

Milk.—In each of the three years we have definitely attributed about 10 per cent of the cases originating in the District of Columbia to milk-borne infection. These

cases occurred in the course of pronounced milk outbreaks among the customers of certain dairymen. In the season of 1906 there were three such outbreaks, in the season of 1907 one, and in the season of 1908 one. The outbreak in the fall of 1908 was of particular interest. Fifty-four cases occurred in this outbreak. The cases developed synchronously among the customers of two different dairymen. One of the dairymen received milk from 22 farms; the other from 2 farms. It was learned that a certain farm supplied some milk to both dairymen. An investigation was made of this farm, but no history of any illness on the place to account for the infection could be obtained. The possibility of there being a bacillus carrier on the place occurred to us, and specimens of the feces and urine from the 13 persons living on the farm were obtained and examined. The specimen of feces from the woman most concerned in the handling of the milk was found to contain typhoid bacilli in large numbers. This woman had had typhoid fever eighteen years before, and gave a history of having been since then in robust health. A report of this outbreak is published by Lumsden and Woodward in the Journal of the American Medical Association for March 6, 1909.[a]

Besides the cases which have occurred in the course of pronounced milk outbreaks, we believe that there have been a number of scattering cases due to infected milk which we have not been able to trace, and we consider milk one of the major factors concerned in the transmission of typhoid fever in Washington.

Contact.—Of the cases originating in the District of Columbia in the typhoid seasons of 1907 and 1908 about 20 per cent gave a history of more or less direct or indirect association during the thirty days previous to onset of illness with previous cases of typhoid fever in the febrile stage of the disease, and were attributed to infection by contact. Considering the amount of association between persons living in a large city and the number of ways in which infection through personal contact may occur, it is easy to understand that many cases of typhoid fever in a large city may be due to infection by contact which can not be traced.

We regard contact as one of the major factors concerned in the transmission of typhoid fever infection in the District of Columbia.

Imported cases.—About 24 per cent of the cases of typhoid fever which were reported in the District of Columbia during the typhoid seasons of 1907 and 1908 were cases in which the infection had been contracted outside of the District of Columbia. In the 1906 period the imported cases amounted to about 15 per cent of the total.

There are many interesting details as to seasonal prevalence, racial distribution, etc., to which reference might be made, but they are set forth in the publications, and I think I have already cited enough to give you some idea of the great intricacy of the typhoid fever problem in Washington. There is no mystery as to why Washington still has some typhoid fever, but there does seem to be some mystery as to why Washington still has so much typhoid fever. It must be confessed that for a city having little or no water-borne typhoid infection, and under the climatic and general sanitary conditions of Washington, a typhoid fever death rate of 35 per 100,000 per year is comparatively excessive.

In approaching the problem of Washington's "excessive" typhoid fever rate we at once realize the need of data comparable with those we have collected here from other cities. Unfortunately, such data as are now available are too meager to be of much value to us. Investigations similar to the one we are conducting in Washington, if carried out simultaneously in a number of the larger American cities, would throw much light on the great problem of urban typhoid fever, both locally and generally.

Considering the tremendous tax in lives and resources which the American nation pays annually to typhoid fever, the time certainly seems ripe for our health officials to formulate and to begin a general and concerted plan of action against this "pestilence that walketh in darkness."

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[a] Journal of the American Medical Association, March 6, 1909, vol. 52, pp. 749–752.

The Temporary Chairman (Doctor Kerr). Before submitting the subject to the conference for discussion, it is pertinent to state that since this investigation was begun two investigations of a like nature have been undertaken in other cities. The health officer of Richmond, Va., during last summer studied typhoid fever in that city and his results are published. In view of the opening of a filtration plant in Pittsburg, it was thought that studies of the typhoid fever situation before the opening of the plant and afterwards would be of interest as they had been in Washington. A commission was appointed, therefore, by the mayor, consisting of Dr. Samuel G. Dixon, commissioner of health of Pennsylvania; Dr. J. F. Edwards, health officer of Pittsburg; Dr. Wm. T. Sedgwick, and Surg. M. J. Rosenau. This commission undertook the study of typhoid fever last year in Pittsburg, and there were appointed by it a number of experts to undertake the bacteriologic and epidemiologic studies. I do not believe that their report has been published.

Doctor Lumsden. No, sir.

The Temporary Chairman (Doctor Kerr). With these exceptions I am not familiar with any investigation of the same extent. It is necessary to state, however, that in Baltimore typhoid has received considerable attention and study by the local health authorities. Are there any further remarks?

Doctor Holton. How about its communication by flies? Did you pay much attention to that?

Doctor Lumsden. Yes, sir; we have given considerable attention to flies as possible agents of transmission of the infection. In the investigation of each case we note whether the residence occupied by the person affected is screened, the abundance of flies in the house and the neighborhood, the proximity of the house to stables, etc. We have found that there appears to be no disproportionate number of cases among persons living in houses which are not screened and in which flies are abundant.

Last summer at the request of the typhoid fever board Dr. L. O. Howard, Chief of the Bureau of Entomology of the Agricultural Department and consulting entomologist to this service, undertook an investigation to determine the seasonal abundance of flies in Washington. About 60 stations located in different sections of the city were established. At these, fly paper was placed every other day and exposed for forty-eight hours. Then the paper was returned to the bureau where a count of the flies caught was made. The results of this determination of fly abundance will be published in our next report which is now in press. The charts show that the curve of fly abundance reached its maximum about July 1 and then declined quite uniformly. By the first part of August flies had diminished to about half of the number found in the first of July. The typhoid fever

curve reached its maximum early in July and continued high until the latter part of September. The lack of corelation between the curve showing the seasonal abundance of flies and that showing the seasonal prevalence of typhoid fever and all the other evidence which we have collected oppose the view that the fly is a major factor in the causation of typhoid fever in Washington.

Doctor HOLTON. In relation to the flies, I would also like to inquire how completely the city of Washington is sewered? I noticed that Baltimore had no sewerage. They are supplied by surface drainage. It occurred to me that the flies would be excellent carriers there. I wondered whether Washington was any better in that respect than Baltimore?

The TEMPORARY CHAIRMAN. (Doctor Kerr). Doctor Woodward, can we call on you to answer that question?

Doctor WOODWARD. I think we may say that the city of Washington is well sewered at the present time. There are very few privies in Washington, but of course a reasonable number in the suburbs. We have abolished, I observed from the records a few days ago, 9,000 since 1895, when a law was passed which permitted us to abolish privies. I think we have gotten rid of most of them within the city limits. I may say from a careful study of the typhoid fever situation in the District, that flies had very little to do with its spread. We prepared for several years ordinary spot maps indicating by white pins box privies, because the law requires them to be registered, indicating by black pins typhoid cases. There was an absence of privy pins where the typhoid pins were located, indicating that there was less typhoid where they had privies than where they had water-closets. As the sections in which privies were located were not supplied with Potomac water, we attributed the absence of typhoid fever to the absence of Potomac water. Since we have gotten rid of the privies and filtered our Potomac water and yet have too much typhoid fever we have to confess that we were very much deceived.

Doctor SWARTS. I have often met with the question of typhoid in Washington, and many who argued against water cited typhoid in Washington following the introduction of the filters. Being an advocate of filters, I have always made the statement that probably the cases of typhoid fever were in persons who were drinking well water. I regret very much that you did not get any information as to why filtration has not been more successful. I noticed that your paper showed the proportion of people using well supplies, and I supposed they had private supplies.

Doctor WOODWARD. We have closed the wells also. We have a few deep public wells that have stood the chemical and bacteriological test and there are a few shallow wells—nine in all—in the remote suburbs.

Doctor BRUMBY. Are 89 per cent of your population connected with sewers?

Doctor WOODWARD. I think that is a fair estimate. I think we may say that at least 85 per cent are connected with a sewer. There are practically no privies in the densely populated parts of the city. We have the right to require sewers and make people connect with a sewer, and we have the right to do it for them, and assess the cost. We have abolished 9,000 privies in the period mentioned.

Doctor SWARTS. This report shows milk to be responsible for 10 per cent, contact 20 per cent, and imported cases 24 per cent. That makes only 54 per cent. Do I understand that the other 45 per cent were unaccounted for? Is that true?

Doctor LUMSDEN. Yes, sir. Those cases are left as unaccounted for; that is, nothing could be definitely ascertained. We had that percentage of individual cases in which we could not trace the infection.

Doctor WOODWARD. I would say that I think they did very well to account for such a large per cent. I want to say that we undertook just such an investigation, but the typhoid board accounts for more than we could. They attribute 10 per cent to milk, while our own experiments have hardly been able to attribute more than 5 or 6 per cent, so that they have gotten about everything, I think.

Doctor BENNETT. I was interested in Doctor Woodward's statement that in the districts where privies existed less typhoid was found than in the districts where water-closets existed with sanitary sewers. Now, I also understood the Doctor to have remarked that he accounted for the less prevalence of typhoid in the districts where cesspools existed than in the water-closet districts because of the fact that the districts having cesspools were not supplied by water from the Potomac. Now, one instance where that does not hold occurred in Colorado. We did not have the waters of the Potomac flowing through our State, but some time last summer I was sent by the state board of health over to the town of Monte Vista. The mayor had applied to the state board to send some one down on account of the cesspools. They had a subsoil irrigation. You only have to dig 1 foot to get water. My investigation showed me from five to even ten cesspools in one back yard, and one gentleman informed me he did not know where he was going to dig his next cesspool. The subirrigation would cause seepage and back yards would be overflowing. I found even the public schoolhouse flooded with water that was contaminated by neighboring cesspools, and yet, that all said and done, the typhoid cases reported from Monte Vista were less by a very great deal than the typhoid cases in the city of Denver with the latest sanitary sewer system and many other towns in the State with sanitary sewers.

Doctor BRUMBY. What was the population of Monte Vista?

Doctor BENNETT. I can not tell you exactly, but it is quite a live young western town, and I suppose it would run to about 6,000 or 8,000 people.

Doctor BRUMBY. Do you not find that cities from 2,000 to 5,000 run less typhoid than those of a greater population?

Doctor BENNETT. Yes; I think that is true. But the fact remains that Monte Vista applied to the state board to send a representative, and tried to have the council put in sanitary sewers, and in one back yard there were 10 cesspools. I reported that the principal product of Monte Vista was cesspools, and yet the typhoid mortality and cases were less than in some of our towns with sanitary sewers, so I can not feel that the Potomac is entirely to blame.

Doctor WOODWARD. I am not blaming it on the Potomac. We have no cesspools here. Our privies are provided with tank receptacles from which the fecal matter is removed by pneumatic pumps. In no case is it beneath the ground. They are cleaned out at public expense. You have simply to call on the government and a wagon will be sent and the contents removed, all without any cost, so that there is no carelessness. They are required to keep them in condition themselves. Ordinary lime is used.

Doctor SWARTS. Speaking from a biological and bacteriological standpoint, I think the Potomac has the advantage over the cesspools. The typhoid bacillus would have a hard time to live in sewage. I should expect that he would be killed out in these cesspools in the West, but the Potomac would have an advantage in producing typhoid bacilli over them. But I think, gentlemen, that this is a very important thing and it is a mighty consoling fact to many of us, where we do our best and have to go back to the office and can not find out anything. Here is this department with any amount of funds and in the District of Columbia with nothing in the way and they can not find the cause of it in but 45 per cent of the cases. It is a pleasure to go back and say: Here this department, this service has gone to work and they can not find but 45 per cent. We were finding more than that.

The SURGEON-GENERAL. Did you find 55 per cent?

Doctor SWARTS. Yes; I have.

The SURGEON-GENERAL. We expect by the next year to arrive at pretty definite conclusions. We do not think that is an unsolvable problem.

Doctor HURTY. Now, about the privies and the flies. Of course, if the privies themselves are not infected their deposits do not threaten typhoid. In Indiana we had an experience which gave us a pointer as to the way typhoid fever was spread at our Soldiers' Home. Typhoid fever broke out there, yet it was a model of good sanitation,

with perfect water supply, perfect sewage disposal. The commandant's son had been to school and returned with a walking typhoid; yet there were times when he was pretty sick. From him the disease spread all over the institution. We traced the matter and found that the next person attacked was the wife of the physician who had attended the young man, and the next person was a patient of his, and he diagnosed the malady as "heart trouble." Sixty-five cases in all appeared in the wake of the doctor; therefore we concluded that 65 per cent of all cases were carried by doctors.

Doctor BRACKEN. What percentage were contact cases?

Doctor LUMSDEN. About 20 per cent of the cases originating in the District of Columbia during the periods from May 1 to November 1, 1908.

Doctor BRACKEN. It is interesting to know that such a study is being carried on in Washington. At times we have a chance to study certain epidemics. Last summer in Mankato, a city of 12,000 inhabitants, the high water flooded sewers and contaminated the public water supply. There was first an epidemic of diarrheal troubles and later a typhoid-fever epidemic, for the sewage was infected. There were about 400 primary and 40 secondary or contact cases. The death rate was low. A complete study of this outbreak will be reported in the near future by the Minnesota state board of health.

Mr. SEYMOUR. Is this based on accurate returns?

Doctor LUMSDEN. I think Doctor Woodward can answer that.

Doctor WOODWARD. I believe almost all cases were reported. The experiences of the service in connection with this investigation of last year indicated that all cases within this District had been reported. From my own observation I think we have nearly as complete returns from typhoid as from any disease. Probably more complete.

Doctor LUMSDEN. In the summer of 1908 we made an intensive study of certain districts representing the average conditions in Washington. The area covered comprised about 32 city blocks and had a population of about 5,000. One of the purposes of this intensive study was to determine the number of cases of typhoid fever which are unrecognized clinically and are not reported. We found no cases clinically typhoid fever which had not been reported, but some of the cases reported as typhoid apparently had been diagnosed on doubtful clinical evidence and without any attempt to have the diagnosis confirmed by laboratory tests. After following the situation for three years we have the impression that in Washington typhoid probably is over reported—that is, more cases are reported as typhoid than exist in a clinical sense.

Doctor BRACKEN. Do I understand that this same Washington commission is taking part in the study of typhoid in Pittsburg?

The SURGEON-GENERAL. It is an investigation into the continued prevalence of cases of typhoid fever in the District of Columbia, but it is so carried on that it is hoped it will serve somewhat as a basis for the investigation of other cities and it has so served in regard to the investigation of typhoid in Pittsburg and I believe in Richmond. I suppose you have all received the first and second reports of our investigations. We have plenty of them and can send them to you. The third report is now in press. I wish to emphasize the fact that if in a number of States similar investigations could be made we would then be able to compare reports and arrive at more definite conclusions for the country as a whole. If the same kind of investigations could be carried on in a number of States or cities the data obtained could be compared and accurate deductions drawn as to the origin and prevalence of the disease. We are now in the fourth year of our investigations and think this will be the final year. The four volumes will form, we believe, a very complete treatise on the methods of investigation, not only in the District of Columbia, but for the guidance of others if they choose to use them in conducting experiments in other States.

Doctor PORTER, of New York. It does not seem to me, on this very able presentation concerning the investigation of your board of typhoid in the District of Columbia, that we have any reason to be discouraged because of the conclusions, or the foreshadowed conclusions, of this report. It is true that we would like to hold to our old belief that typhoid is merely a water-borne disease and that if we can guard against that we would be safe. It is too bad that such a belief as that should have to be destroyed. There was a time when some of us thought that if we could filter the water supply and guard it against the chance of infection we had done practically all we could against the ravages of typhoid fever. This report we have listened to may have come as somewhat of a disappointment to some of us. It is, maybe, somewhat of a disappointment, looking at it from a narrow standpoint, that we must put Washington in the list of those cities where filtration has not reduced materially the typhoid rate. But there have been other instances. In a small town in New York typhoid broke out and the attention of the department was called to it. There was no chance there of water infection at all. There were 10 cases, isolated one from another, and they presented a very difficult problem as to the cause of that very small outbreak. And so in towns where water filtration has been attended to, where sewers are in good shape, we have outbreaks of typhoid, and so we have come to realize that there are many other factors besides the water supply, and so I feel that this report is really an inspiring report. It has pointed out to us not only the way to make an investigation, but it has illumined the

path in the search for a solution of this question, and I think it has shown us the lines, in some cases at least, upon which we must proceed; and so I agree with our chairman that if we can have the different States operate along similar lines and have certain standards, that will aid us a great deal to get good work. I would like to ask the distinguished gentleman who read the paper about shellfish and oysters as factors in this typhoid.

Doctor LUMSDEN. In the investigation of each case inquiry is made in regard to the eating of uncooked shellfish during the thirty days previous to onset of illness. Shellfish as a factor can not be entirely excluded. They may be responsible for scattering cases, particularly for some of those occurring in the winter, but all of the evidence is against their playing much part in the transmission of the infection in Washington. The typhoid season here extends from June to October—about 70 per cent of the cases for the whole year develop in this period. In these months comparatively few uncooked oysters or clams are eaten in Washington. Of 514 cases of typhoid developing between May 1 and November 1, 1908, only 23 gave a history of having eaten raw oysters within thirty days previous to onset of illness and only 17 gave a history of having eaten raw clams.

Doctor PORTER, of New York. And none of those could be definitely attributed to shellfish?

Doctor LUMSDEN. There was only a small number of the cases from which we could not get quite definite histories as to the eating of uncooked shellfish.

Doctor HURTY. How about vegetables?

Doctor LUMSDEN. It is very difficult to form an idea as to what part vegetables probably play. The tracing of vegetables to their original source is difficult, if not impossible, in a city in which they are handled as in Washington. Here most all the vegetables are distributed from large markets. We can trace them to the market but there we lose the trail. People do not remember at what stands in the markets they bought, and a given dealer in the market usually buys vegetables from many different sources.

Doctor HURTY. That would be water-borne infection, wouldn't it?

Doctor LUMSDEN. In some instances perhaps the vegetables become infected from water, in others, however, the infectious excreta of persons may reach vegetables directly by being thrown out on the truck patches.

Doctor HARPER. Are the contact cases traced to nurses, physicians, or any other members of the hospital staff or are they visitors who come in contact with the regular patients, or are they attendants?

Doctor LUMSDEN. I can not say definitely just what the figures are. Some of the cases which we have attributed to direct contact

have been among physicians, nurses, and others attending the sick, and some have been among visitors to the sick. In attributing a case to contact with a previous case we take into consideration the amount of association had with the primary case and the preventive measures carried out. If the association was free and no precautions, or inefficient precautions, taken in the handling of the patient and the disposal of the excreta, we estimate the chances of infection by contact at about 100 per cent, provided the time between the onset of the primary and that of the secondary case was sufficient to cover the usual incubation period. A case giving a history of having visited for a few minutes a typhoid patient in a hospital, for instance, where thorough precautions were taken and not having touched the patient we do not believe could reasonably be attributed to contact. Between these two extremes there are cases which have had some association with patients where the precautions were only fairly efficient, or which have been in association with careless attendants of typhoid patients. In these we estimate the chances of infection by contact at about 50 per cent and consequently include in our contact percentages only one-half of the number of cases which give such histories.

Doctor Harper. There was a little epidemic in our State in a boarding house that had 90 boarders, and suddenly within five or six days we traced 44 cases of typhoid to that boarding house. Doctor Ravenel, the local health officer, and myself investigated very carefully the entire environment, and we found that one of the students who was a dishwiper had been ill for about three weeks before. On investigation it was found that he had typhoid. One of the maids in the house who did the same line of work with this student also had typhoid and had been ill not so long as the student himself. I think that as a result of the investigation we eliminated practically every source—ice, milk, groceries. We went to the grocery store and got a list of their patrons. None of these houses had any typhoid, so the epidemic was entirely restricted to the people who took their meals within this household, showing very clearly that the fellow who had been sick there three weeks and reported with diarrheal trouble had been a prominent factor in the spread of that disease. There were two cases—there were 42 came down originally—and two cases of people who were not boarders at this house, but we tracked the disease around to it. This emphasizes very strongly the personal transmission of the disease.

Doctor Price. There are two questions in the situation in Washington that have puzzled sanitarians throughout the country. The first question is, Why the improved water supply did no good? and the second is, Why Washington should have such a large amount of typhoid, considering its population? I think it is pretty clear from

Doctor Lumsden's figures that the improved water supply has done good and has diminished the typhoid death rate. There has been annual diminution of typhoid fever, and it has not been any greater than you might look for when you consider the large volume of the Potomac River and the consequent dilution, which has always existed, of polluting materials. I think there is also another question involved. The Public Health and Marine-Hospital Service advertised that they would make the examination for the Widal test, and a very large average of the clinical cases are being proven correct here in Washington by laboratory diagnosis. If we assume that in 1905 there was 80 per cent of correct diagnoses, I think we can say that the percentage has risen to 90 or 95 per cent since then. The same condition exactly occurred in St. Louis when the suit came up between Chicago and St. Louis about the Chicago drainage canal. The health department of St. Louis circularized the medical profession at the time of this suit, and as a consequence they reported every case found as far as they possibly could, and both the mortality and morbidity rates showed a marked rise. I think the reason is perfectly clear why Washington should have more typhoid than other cities of its size. The population is a young population, the average age being between 20 and 50 years. It is that time of life most susceptible to typhoid. Washington is more than any other city a nonresident city. The number of transients is very large, and many of the employees, government employees especially, live out in towns in Maryland. The conditions in those towns are not very good, and this very clearly accounts for some of the typhoid in Washington. This is also one of the most extensively visited cities in the country. People come here after contracting typhoid during the time of their vacation, and they die in Washington and their deaths are credited to Washington's death rate. I do not think that the history of Washington contradicts the universal experience, and that the water supply does not have its effect on the typhoid death rate.

Doctor KELLEY. I would like to ask Doctor Lumsden what percentage of cases of typhoid in one year have subsequently proven to have been possible carriers in former years. Has any effort been made to see how many were cases in 1906 and 1907?

Doctor LUMSDEN. There has not been done hitherto any systematic work of that kind. We are doing it this year. In our search for carriers we have examined the feces of over 100 persons who gave a history of having had typhoid in previous years. So far, among such persons we have apprehended only one carrier in the District of Columbia.

Doctor FRANTZ. Are the summer resorts furnished with Potomac water or do they have springs?

Doctor LUMSDEN. Most of them are supplied with water from sources other than the Potomac River. I do not know of any that use the filtered Potomac water.

Doctor FRANTZ. We had an epidemic in Wilmington and had to blame it on something, so got out of the city and investigated the Brandywine and found it polluted. We traced the infection and found that 90 per cent of the cases were patrons of these resorts.

Doctor LUMSDEN. We looked out for that here. In investigating the cases we inquire as to what summer resorts have been frequented. We have not found evidence sufficient to fasten undue suspicion upon any one of them.

Doctor HARPER. Have you noticed any increase of typhoid on the return from summer resorts? Do you find that they bring typhoid with them?

Doctor LUMSDEN. We find quite a number in the early fall; that is when the people are returning from the summer resorts. Of these people who have been away and who come home on account of illness, or develop illness within a week or two after their return, we find the proportion is considerably higher in the fall than in other seasons.

Doctor HARPER. That would be about September?

The SURGEON-GENERAL. I would like to suggest that before this subject is closed a review of the work of the army commission with regard to typhoid during the war would be very interesting. If you remember, about four years ago Doctor Vaughan surprised us very much when he told us what a large proportion of typhoid in the army camps was due to contact. Sixty-five or 70 per cent I think it was. If you would like to have a copy of his statement, I would be pleased to send it on request. It was published in the Public Health Reports. That was the first insight I had with regard to typhoid being spread principally other than by water. Up to that time I had considered, and it was the general impression, that typhoid was chiefly a water-borne disease. Doctor Vaughan's remarks were very forcible, so were his statistics. Is there any gentleman who wishes to say anything further?

Doctor RICHARDSON. Doctor Lumsden stated, I think, that in hospitals the precautions taken against typhoid fever were such that the disease would not ordinarily develop among the hospital personnel.

I think that his confidence is somewhat misplaced. At the Massachusetts General Hospital we have found that during the past ten years from two to five cases of typhoid fever have developed annually among 125 nurses and ward tenders employed in the institution, and that this has occurred in spite of careful instructions given to prevent just such occurrences.

If typhoid infection can occur among hospital nurses, who are women of more than ordinary intelligence and who have been emphat-

ically warned against the dangers of acquiring the disease, the more frequent transfer of the infection among the laity can not be a cause for surprise.

Doctor LUMSDEN. I should like to make a statement in regard to the number of cases which we have been able to account for by milk-borne infection. Doctor Woodward said only about 5 per cent——

Doctor WOODWARD. Five or six, I think.

Doctor LUMSDEN. I think the apparent discrepancy between our percentage of cases attributed to infected milk and that of the health officer is explained by the different periods of time considered. The health officer's figures comprise the cases for the whole calendar year, while ours comprise only the cases which occurred in the periods from May 1 to November 1. In each of the three years the recognized milk outbreaks occurred within the periods between May 1 and November 1. I believe our figures and those of the health office agree as to the actual number of cases.

In regard to Washington's "excessive" typhoid rate, it should be borne in mind that Washington climatically is a southern city. So far as I have been able to ascertain from available records, there is no city of over 75,000 population south of Washington and east of the Mississippi River which, during the past two years, has had a lower typhoid rate than has Washington. The general sanitary conditions and the sewerage system of Washington are better than those of the average southern city. These conditions, of course, should be considered in comparing typhoid rates.

There is some question whether a typhoid death rate of 35 per 100,000 is really "excessive" for a city having the climatic and sanitary conditions of Washington. Some may hold the view that such a prevalence of typhoid argues that the public water supply in some way is still a factor in the causation of typhoid fever in Washington. Even if the water is entirely blameless, we do not consider the fact that we have been able to account for only about 45 per cent of the cases which we have investigated as cause for discouragement. Once the infection is allowed to escape from the bedside of the patient, there are many ways in which it may be spread and yet be difficult or impossible to trace. There is such intimate association between persons living in a large city. Think of the number of persons who, in the course of a few hours, grasp the same handle or strap of a street car, and how difficult it would be to trace infection which had been deposited on that handle or strap by the hand of some careless attendant of a typhoid fever patient.

Doctor BRUMBY. In a town of 300 population we had 30 cases and 3 deaths in three or four weeks. The water supply—90 per cent of the people took their water supply from one well, 450 feet deep, having two tanks, used as reservoirs, each holding 20,000

gallons, and they were both examined bacteriologically and chemically, and one tank was found to be contaminated with the colon bacillus. One tank was of galvanized iron and the other a wooden tank. The wooden tank was infected. It had also been infected two or three years before with typhoid. It had been out of commission for two or three years, and only the iron tank had been used; but at that time the iron tank was being repaired, and this was the first summer that the old tank was used again. It had been washed pretty thoroughly and had been used all summer. At the time it was examined it had been sealed around with gauze to keep flies and insects out. But some of the boys had thrown rocks and broken the gauze, and when emptied we found the remains of two birds which had been in there a few weeks. The tank was emptied and torn down. That was the only source of water—the only well—in the town except some rain water. The following two or three weeks a few cases, possibly six or eight cases, occurred, nearly all contacts. There was not another case except in the same families which had already had it. We have an arrangement in Texas by which towns of 10,000 or greater can obtain special charters. When they get special charters they can increase taxes and pay a little more attention to sewage and drainage; paving, too, frequently comes first. They also give more attention to water and sewers than the cities of less population. We have found on this account in this class of cities that the death rate is getting a little lower. That has been the history of every town in the State. When they begin to pay proper attention to their water and sewage, there would necessarily be a lowering of the death rate from typhoid fever. The death rate to-day is greater in the small towns than in the larger ones.

The Surgeon-General. Gentlemen, our time is getting a little short, so I think we had better proceed unless somebody has something particular to say. But before doing so I want to appoint the committees that have been provided for by resolution. We were asked to name one of the officers of the corps as chairman of the committee on the prevention of rabies, and I will name that committee as follows: Dr. John F. Anderson, assistant director of the laboratory; Doctor Swarts, Doctor Probst, Doctor Brumby, and Doctor Woodward. And on the motion of Doctor Bracken that a committee on leprosy be appointed to draw up resolutions relative to the national care of lepers in the United States, I shall appoint Doctors Bracken, Porter, and Hurty.

Now, gentlemen, what is your pleasure? I understand that——

Doctor Frantz. I move that the committees appointed be accepted.

Doctor Smith. Doctor Bracken made some sarcastic references to the insignificance of this disease—that is, according to his interpretation of what had been said. There is no doubt as to the insignificance of it, and I think something should be stated about its insignificance when it is considered from a mortality standpoint. Now, then, it seems to me that it would be a mistake for this conference to ask the Congress to spend much money on this line. I am not opposed to the Government doing work along these lines on this disease, insignificant as it is, but I would not have this conference go on record urging Congress to spend money in this direction when there are other diseases, influenza, for example, or pneumonia, both of which are many, many thousand times more important as to effect upon the whole people. I say, therefore, that this conference should not ask Congress for money along these lines; I would not ask them to do so.

The Surgeon-General. Doctor, you must recall that at the last conference a public-health measure was recommended. This conference is on record as recommending to Congress the passage of the bill which was and is before Congress. Resolutions were passed indorsing the bill by sections and it embraces the work of the Government in public-health matters. I just wanted to remind the doctor of that, and I do not know that he knew of that fact, because he was not, I believe, at the last conference.

Doctor Swarts. I did not understand when that matter was being considered, i. e., relieving the different States of the care of lepers, that it was to include anything else, but was simply one of the good things and that others would follow.

Doctor Smith. The more we ask of Congress the less it will do along other lines. If, for instance, Congress establishes a leprosarium it will be very slow to establish a national tuberculosis sanatorium or means for investigating such diseases as pneumonia. What I mean is that we should get Congress to exert its influence, its energy, on diseases that are important, so far as mortality is concerned. Doctor Bennett and Doctor Wills, who have had more opportunity to look into the matter as regards the communicability of leprosy, do not seem to think so much of it. I think the people at large have gotten their ideas of leprosy from Ben-Hur rather than from any very modern sources. On the Pacific coast the people do not seem to be very much afraid of it. I will plead guilty to the utter insignificance of this disease when it comes to any serious results. We have seen case after case in thickly populated parts of cities and not a case arises from them. Why then, I say, spend much energy on the communicability of this disease?

Doctor Godfrey. It occurs to me that if the National Government takes control of these leprosy cases it will relieve the state health officers of trouble, and the energy thus saved could be expended in

the control of other diseases—that they can expend that energy in other more appropriate directions.

Doctor SMITH. I want to know if you have not an officer studying leprosy in Hawaii?

The SURGEON-GENERAL. Yes.

Doctor SMITH. Are not the conditions better there for that study?

The SURGEON-GENERAL. Yes; for study.

Doctor SMITH. Why then ask for another place in this country?

The SURGEON-GENERAL. We do not ask for the same kind of an institution.

Doctor SWARTS. We need a home.

The SURGEON-GENERAL. This leprosarium, this home for lepers, is a different matter from the scientific study of the disease which is going on in Hawaii. What is meant by this leprosarium, this home for lepers, is a place to care for them and segregate them, and not as is being done by the service in Hawaii, simply studying the disease. It is to relieve the state health officers, and is more of a sanitary matter than an administrative one. Somebody suggested that this be done, I think it has been practically recommended before by the state boards. However, if you choose to object to it, that is for you to determine, but I trust that you will not have a very long discussion on it, because we want to take up other subjects. The resolution was that this committee be appointed, and the names were mentioned.

Doctor SMITH. Just one word more. I would like to suggest to the chairman that if any of the gentlemen named on this committee should refuse to act, it would be advisable to appoint a gentleman who has had large experience with this disease, particularly on the Pacific coast. I refer to Doctor Bennett.

The SURGEON-GENERAL. I would be very glad to put him on the committee.

Doctor FRANTZ. I move that Doctor Bennett be added to the committee.

(The motion was carried.)

(The resolution was carried.)

The SURGEON-GENERAL. I wish to invite your attention to one matter that will not take very long. It relates to one plan that has been suggested to aid in the suppression of tuberculosis. It is called the Colored Anti-Tuberculosis League. It is not an official league, it is not under official guidance, but in the course of some lectures on tuberculosis, made by one of our officers in two or three States and before colored institutes there were suggestions made that an anti-tuberculosis colored league be established to enlist the negroes in the work themselves and to operate through their church membership, which, as you know, are largely social centers for the negro popula-

tion. As a matter of information the plan is published here on the first pages of the public health report of May 28, 1909, with a brief statement from Doctor Wertenbaker, who has delivered some of these lectures about the proposed institution and its by-laws. I would like to have you look this over at your leisure. The idea is that if this is considered a worthy movement, and it seems to me that it is, for it has met with pretty general approval, especially among the negroes, that anything that might be done to foster it should be done through the state boards. The question is presented for consideration as to whether the state boards will take an interest in this matter and give it their sanction, or in any way foster it. I have had a number of the public health reports mentioned passed around in order that you may look them over at your leisure. Here is the certificate of membership that has been gotten up with a view to hanging in the house and making the owner feel he belongs to something. The movement can be fostered indirectly, both by the state boards and by this service. We can spend no money for them, and we can do nothing directly. We do not want to do anything that is not in accordance with the state board of health or that is not supported by the state boards in the states in which these leagues are formed, and I would like to have an expression by you after a while. I do not intend we shall spend much time on it at present.

Doctor Frantz. Do you mean that it shall be taken up at our conference next Friday and Saturday?

The Surgeon-General. Well, I do not know; I thought you might take it up there, or we might consider it here.

I want to come now to measures against hook worm disease. That is why I brought this matter up.

We have with us here Doctor Stiles, who is known to all of you as the discoverer of the hookworm in the United States, and who has done so much to attempt to eliminate it. I thought it would be timely to have Doctor Stiles come and give us a talk on the subject of hookworm, showing its means of spread in some States, and I hope that state health organizations will take an active interest in this matter. The service will do all that it can, and has been doing all that it can. I hope the state organizations will do all they can to help Doctor Stiles along in the warfare against this disease in which he has taken so great and important a part.

Doctor Stiles responded by reading the following communication:

A Brief Review of Certain Phases of Hookworm Disease.

In connection with the subject of typhoid fever, which has been discussed by Doctor Lumsden, it is well to consider another soil-pollution disease which exists in this country, namely, hookworm disease.

The point that the hookworm disease is spread by soil pollution can not be too strongly or too frequently emphasized. As it is spread only in this way, it is clear that a reduction in soil pollution will result in a reduction of hookworm infection.

As soil pollution is less common in cities, with a sewer system, than in villages and rural districts with a privy system, we have an explanation of the fact that hookworm disease spreads least in cities, then more in villages, and most of all (because of less care of the privy) in rural districts.

There is a tendency on the part of some persons to suppress facts in respect to sanitary conditions, the idea being that an open discussion of this subject is not in harmony with commercial interests. Personally, I must take an opposite view and maintain that we must expose the medieval sanitary conditions found in many localities, so that the laity, including the commercial interests, will appreciate the fact that it is an easy task to reduce the death rate by improving the sanitation.

It is especially from the urban commercial interests that opposition to publicity in this respect arises, while it is especially the sanitary conditions of the open country which I am trying to improve.

When we consider that about 68 per cent of the southern farm houses I have thus far tabulated have no privy of any kind, it is surely time for sanitarians to expose these filthy and dangerous conditions.

Let it be recalled that soil pollution is even more dangerous in the South than in the North, because in our rural South our inhabitants belong to two races of man, namely, the white and the black, and because, also, in this area we have two diseases (hookworm disease and Cochin-China diarrhea), to the severe physical results of which the negro race presents a relative immunity when compared with the white. Further, the negro is a much greater soil polluter than is the white. Of the white farm houses I have tabulated, about 46 per cent have no privy, while of the negro farm houses tabulated nearly 80 per cent have no toilet. In 8 of the States there are 833 negroes to the 1,000 whites, while in the 15 negro States 34.34 per cent of the population are negroes.

It is not only around the homes that I find soil pollution occurring. Strange to say, the sanitary conditions surrounding many of the country schools and churches are indecent and medieval. At a conservative estimate, 30 per cent of the rural schools of the South to-day have no privy; the boys take the woods on one side and the girls the other side; they pollute the soil and exchange infections. From a standpoint of elementary decency, such conditions are to be condemned, and from a standpoint of public health, schools and churches in this condition should be closed until proper sanitary toilet closets are constructed on the premises.

It is important to note that in the South there is a more or less widespread prejudice in the rural areas against a privy. This prejudice is easily explained. In the first place, in a warm climate a privy which is not properly kept is a very unpleasant place; further, many people believe that night soil is less harmful when scattered over the ground; further, also, many farmers wish the night soil as fertilizer; finally, the negro (as a race) has not advanced in his civilization to the point either of modesty, cleanliness, or health ideas to appreciate the advantages of a well-kept privy. These are ugly facts which we must face, and the sooner we face them the sooner shall we be able to reduce the death rate.

The fundamental problem, to my mind, in improving these sanitary conditions in the rural South is first of all to make the toilet closet a less disagreeable place. In order to accomplish this I urge that we introduce the tub system, with a cheap fluid disinfectant, in place of the dry-earth system. As disinfectant, I prefer personally a 5 per cent crude carbolic acid, but if a family can not afford that, much good can be accomplished by filling the tub about one-fourth full with water and by pouring on the water a cup of petroleum; either of these methods will prevent hookworm disease from spreading and will keep the flies away from the excreta.

While my own campaign against soil pollution at present is intended primarily as a fight against hookworms, I would invite attention to the important point that the same measures which prevent the spread of hookworms will result also in a decrease of various other intestinal infections, such as typhoid fever, Cochin-China diarrhea, eel worms, whipworms, and certain tapeworms.

Again, a reduction in hookworm disease inevitably means a reduction in the death rate from tuberculosis, for hookworm infection so lowers the resisting powers of the body and so interferes with proper digestion and a proper supply of oxygen to the blood that tubercular patients who have both infections will, of necessity, have a lessened chance to recover from their tuberculosis.

TREATMENT OF HOOKWORM DISEASE.

The fundamental principle underlying the treatment of hookworm disease is the same as that which underlies the treatment of all other zooparasitic diseases, namely, first treat the parasite, not the patient. After the parasite is treated, attention may be directed to treating the patient.

Although hookworm disease may occur in persons in any walk of life, it is particularly among the poorer classes that it is found, and the average hookworm patient (children excepted to a certain extent) can not afford to lose several days' wages to undergo treatment. It is therefore frequently expedient to conduct the treatment Saturday evening and Sunday morning. It will often be found difficult to arouse the interest of a community in regard to the presence of hookworm disease and the need of treatment. This can frequently be done, however, if it is borne in mind that the resulting anemia is, in common with other anemias, a frequent cause of amenorrhea.

Warning.—Notwithstanding that primarily we are to treat the parasite, not the patient, it should be remembered that if too great a quantity of thymol is absorbed by the patient, alarming symptoms and even death may occur. Accordingly, the patient and the patient's family should be carefully warned not to permit the patient under any circumstances to have on the Sunday during which the treatment is given any food or drink containing alcohol, fats, or oil. Patent medicines should be mentioned in particular, because of the alcohol many of them contain, and even milk and butter should be forbidden. I know of one case of serious thymol poisoning which followed promptly after the patient took a copious drink of milk the day thymol was taken.

Preliminary treatment.—On Saturday evening give a dose of Epsom salts. The reason is this: The hookworms are surrounded by more or less mucus and partially digested food. Unless this is removed the thymol may not reach the parasites, but may reach the patient, and this is contrary to what is desired, as the thymol is intended for the parasite, not the patient.

Thymol treatment on Sunday.—(1) Position of patient: Instruct the patient to lie on his right side immediately before taking the drug and to remain in that position for at least half an hour after. The reason for this is that many of these patients have enlarged stomachs, and if they lie on their right side, the drug has the benefit of gravity in passing rapidly from the stomach to the intestine; but if any other position is assumed, the drug may remain in the dilated cardiac portion of the stomach for some hours and result in considerable complaint on the part of the patient and delay of the drug in reaching the worms.

(2) Time of dosage: The time of giving and size of dose should be arranged on one of two plans, depending on existing conditions.

(*a*) The plan usually followed is: At 6 a. m., one-half of the total dose of thymol; at 8 a. m., one-half of the total dose of thymol; at 10 a.m., Epsom salts (never castor oil).

(*b*) If the case is an especially severe one, or if the patient has, upon the first Sunday's treatment, complained of burning or other effects of thymol, the following plan is adopted: At 6 a. m., one-third of the total dose of thymol; at 7 a. m., one-third of the total dose of thymol; at 8 a. m., one-third of the total dose of thymol (if unpleasant symptoms, as a sensation of severe burning in the stomach, have appeared this third dose should be omitted); at 10 a. m., Epsom salts (never castor oil).

(3) Food: No food is allowed until after the 10 o'clock dose of Epsom salts, but the patient is permitted to take a glass or so of water after the thymol, if he desires.

(4) Thymol: Finely powdered thymol in capsules, preferably in 5-grain capsules, should be used.

(5) General rule as to age: In the table of dosage given in the next paragraph, the maximum dose per day to be adopted as a routine is given for various age groups. In determining the dose, however, the rule should be followed of taking the apparent rather than the real age and of not hesitating to cut down the dose even lower in case of unusually severe cardiac symptoms or other unfavorable conditions. Thus, for a boy 16 years old, who appears to be only 12 years old, or in whom the anemia is especially marked, resulting in severe cardiac symptoms, the quantity of thymol should be reduced to the 12 or even the 8 year dose. Some authors give the impression that it is useless to give thymol for this disease unless the full dose is administered. This view is not in harmony with my experience.

(6) Size of dose: The following doses represent the maximum amount to be used during one day's treatment for the age groups in question. It is practically the same table that the Porto Rican Commission has been using:

	Grains.
Under 5 years old	7½
From 5 to 9 years old	15
From 10 to 14 years old	30
From 15 to 19 years old	45
From 20 to 59 years old	60
Above 60 years old	30 to 45

Total dose, to be divided as indicated in paragraph (2).

Repetition of treatment.—The foregoing treatment is repeated once a week, preliminary treatment Saturday evening and thymol on Sunday morning, until the patient is discharged.

Duration of treatment.—To recognize whether the parasites are all expelled, and therefore to determine when to end the thymol treatment, either of two plans may be adopted, namely:

(*a*) Microscopic examination: On Saturday morning make 10 microscopic preparations of a fresh stool. If eggs are still present, repeat the treatment; if eggs are not found, discontinue the thymol. It takes about forty to sixty minutes to make this examination of 10 slides thoroughly.

(*b*) Cheese-cloth method: A much easier way of recognizing the completion of the treatment, and for practical results nearly as satisfactory as the microscopic examination, is the following: Instruct the patient to wash all of his stools Sunday, Monday, and Tuesday, through a cheese cloth and to keep the cheese cloth moist and bring it to the office on Tuesday. While the fecal material will wash through, the worms will be retained in the cloth. Continue treatment as long as worms are found in the cheese cloth.

Other treatment.—If desired, iron may be administered on the days on which the thymol is not taken. It is a good plan, however, not to give iron during the first week, for it is quite important to convince the patient that the thymol treatment is the one which is really accomplishing the lasting good. If the drug is taken Sunday the patient is likely to begin to feel some benefit by Wednesday or Thursday; his family is likely to notice it on Thursday or Friday. If iron is given during the first week, the conclusion may possibly be drawn by the patient that it is really the iron which is causing the improvement, and he may discontinue the thymol. Of the two, the thymol is, of course, the far more important, for it reaches the parasite, while the iron reaches only the patient.

Doctor Lewis. I am very glad, indeed, to hear what Doctor Stiles has to say. This is a tremendous problem in the South. Doctor Stiles has told the facts as they exist. North Carolina has been abundantly instructed as to hookworm disease by the board of health. It is undoubtedly, in my judgment, the bane of the rural South, and I am very happy to say that the superintendent of public instruction of North Carolina, mentioned by Doctor Stiles, has proposed to establish a public health class in the public schools, in which the hookworm will be one of the subjects taken up.

Doctor Porter, of Florida. I wish to emphasize what Doctor Lewis has said with regard to North Carolina in respect to my own State of Florida. I do not think there is a physician in Florida that is not thoroughly posted on hookworm disease, and the information has been given through the Florida health board from the laboratory, not only to the physicians but also the teachers of the State, and during the past year very instructive lectures have been delivered with stereopticon slides, and information of that kind. The fact that the people have awakened to the necessity of eradicating this disease is evident from the quantity of thymol that the wholesale druggists in the State are now carrying. A few years ago they carried from 2 to 3 ounces, or a pound, of thymol. Recently in one town of less than 3,000 inhabitants there was a consignment of 50 pounds of thymol, so that shows that they are waking up to the necessity of doing something for their children, and the legislature of Florida, which is now in session, has recently passed a bill that will put the whole subject under the care of the state board of health, with ample authority to do whatever is necessary in the premises, and I think it will be but a few years when you will not hear of the hookworm disease in Florida. I do not think there is such a deplorable condition among the schoolhouses in Florida as Doctor Stiles supposes. I do not think he can say that, because he has not visited us very recently; but if he has, he has come incognito, because I have not heard of his being in the State.

Doctor Bennett. I would like to ask Doctor Stiles one question in regard to that one remark he made, that if the requirements of a medical man in the South were increased, it would mean practically taking away the medical aid in that part of the South. Now, it seems to me that a community which has medical men who have had the same text-books for ten years and among whom you can find but one medical magazine and that two weeks old, it would be far better to increase the requirements than to let up upon them. It seems to me a little knowledge is a dangerous thing, and if they were better educated and were required to meet the requirements as laid down by the American Medical Association and the colleges, it seems to me they would be better fitted to take care of this disease and other

diseases, and in their health work, in the community in which they live.

Doctor STILES. Will you guarantee to keep the locality supplied with physicians? In these localities they can not keep physicians because the doctors can not earn over $150 to $200 a year. Is the West prepared to guarantee to the South the presence and support of physicians in out-of-the-way districts? As soon as the West is prepared to guarantee that I hope the requirements will be put way up, but I think it is cruel to take all physicians out of the Appalachian regions simply to raise the medical standard in another part of the country. The question of medical requirements is a local problem.

Doctor BRACKEN. Is such a physician worth anything to the community?

Doctor STILES. Most decidedly. Yes, sir.

Doctor LEWIS. The standard of requirements in our State is extremely high, and Dr. Daniel Lewis told me that taking out a few of the most prominent physicians of Boston, that the North Carolina Medical Association impressed him more favorably than the Medical Association of the State of Massachusetts. There are certain sections of our State—those wild and rugged mountain sections—where the people are very poor, and it is simply impossible to get a man who can come up to the requirements to live there. But we think that the people who live there should have some one, and as a matter of fact some of the physicians in these country parts who do not keep up with the requirements have a great deal more common sense, a great deal more resources, than some of our city physicians. We brought to the attention of the last legislature the fact that some of the profession were practicing without licenses, and that we were opposed to special acts for the relief of these physicians. I proposed an amendment to the medical license law which leaves it to the discretion of the board of medical examiners to grant limited licenses, under such conditions as in their judgment seemed necessary, which would authorize a physician, who can not come up to the full requirements, to practice medicine in certain circumscribed districts. If this amendment is adopted it will be effective over a large area of our mountain country.

Doctor BRUMBY. I need not make apologies for Texas, or the conditions as the Doctor found them. I do not know whether the Doctor made investigations in Texas, or Louisana for that matter. I think Texas physicians—almost any physicians are willing to learn, and there are certainly more tropical diseases in Texas than in any other State in the Union because of its geographical position. I think it is unfortunate that there is not more of that disease in the West and East where we have more investigators. With all our

schools (regardless of the birth of the man in charge) there is little of the research work going on to-day in the South, but the material is always right at our elbows, with regard to these subtropical diseases that are with us all the time. I could give instances showing where some of our best men have fallen down in their diagnosis on some of these diseases. I certainly would like to see that commission appointed, and I hope it will be done, and that we will have the funds from some source, because we have failed signally to get our legislature to give us anything for scientific work. I think it is unfortunate that the Doctor could make such a statement. I should like to have it known that he did arraign Texas in these matters of interest. These diseases of which we have the most too frequently we give over to other parties to study and care too little about them ourselves.

The SURGEON-GENERAL. Are there any other remarks on this subject? If not, before it gets too late, I want to announce that we will meet at the New Willard to-morrow morning at 9.15 and start a few moments after for the laboratory. Two or three of us will be there to show you the way, but if by any chance you do not find it convenient to be at the New Willard come over to the laboratory and try to be there by half past 9 or 10 o'clock. There is one other matter. Before we get separated, I want to refer to the programme after we have been at the laboratory. I think we can occupy the forenoon at the laboratory, and then about 12 o'clock I think the Secretary of the Treasury will be very glad to see us. I think it will be a pleasure to him, and I think it will give you pleasure to meet the new Secretary.

There are one or two other topics to be considered, and I desire to briefly call your attention to recent events in relation to vaccine virus and the foot-and-mouth disease. I am having passed around a statement prepared in the bureau which supplies you with information as to what has transpired, together with some new regulations specially prepared in view of the new developments with regard to the possibility of the foot-and-mouth disease being carried by vaccine virus. I do not propose to take up much of your time with this subject, because we have to get at the subject of pellagra, but I will briefly state that it was found that foot-and-mouth disease was in the vaccine virus of two firms. The micro-organism of foot-and-mouth disease has not been discovered. Foot-and-mouth disease has never been known to occur in a human being following vaccination, but there have been some few cases which have been attributed to infected milk. As soon as we discovered that this foot-and-mouth disease was transmitted to vaccine, we immediately began an inves-

tigation of all of the vaccine virus on the market and the establishments propagating it. We found only two firms whose product was contaminated. We examined five other firms who were licensed, and their products were absolutely free. The suspected virus of the two firms was withdrawn from the market. The license of one firm had expired and was not renewed, and the license of the other was suspended. Three inspections were made of each of these two establishments and the plants were thoroughly disinfected. The infected vaccine virus was imported probably from Japan for the sake of strengthening the stock of one of our well-known manufacturers, but it had apparently done no harm. It had not been conveyed to one human being. One firm in connection with whose vaccine it was found had been killing their cows after vaccination, while the other firm had been turning them back into commercial channels. An effort was made to make a great sensation out of this, and it was with considerable difficulty that the matter was judiciously handled. There was no effort made at concealment, but to have given it out until the necessary precautions had been taken might have done great harm to the cause of vaccination. This announcement is made with the absolute proof and assurance that there is no contaminated vaccine on the market. Special regulations have been issued under the law for the inspection of all vaccine and other biologic products that may be introduced from abroad through a port of entry. The regulations require that samples must be sent, and the collector of customs forwards them to the bureau for examination. They are examined in the hygienic laboratory, and if the stock is found to be all right the entry of the shipment will be allowed. There is only one firm abroad now that attempts to import vaccine into the United States. They can not do that without a license, but even with a license their products will be examined before leaving the custom-house. They will probably cease importing within a year, so by that time our vaccine will probably be all of domestic manufacture. I wanted to call your attention to this matter. The facts have just been published, and you may be interested in my statement at the end of the pamphlet given to you.

Gentlemen, there is one more subject of very great interest, and that is pellagra, a disease which has recently attracted considerable attention, particularly in the South, and to which attention is being given by our service through its hygienic laboratory. We have detailed one of our officers who has taken a special interest in the disease, from his first knowledge of it, to the hygienic laboratory, for the purpose of having him study the subject there. He is now in the South examining cases. It is our purpose to send him to Italy and other places in Europe in the spring, which is the most

favorable time there for investigation. Doctor Galloway, Chief of the Bureau of Plant Industry, requested our cooperation. He himself is looking into the subject, as the Department of Agriculture is interested in the subject from an economic standpoint, corn being supposed to be the cause of the disease by some, and we are going to cooperate with that department in investigations of the disease. There are two gentlemen here who have taken special interest in pellagra, Doctor Williams and Doctor Harris. Doctor Williams, I believe, will read a short paper on it, and after that I would like to have Doctor Harris talk on the subject.

Doctor Williams, of South Carolina. I have with me just a few photographs. I think this disease exists not only in the South, but in every State in the Union. I brought along some photographs taken by Doctor Babcock in Italy last year. An explanatory note appears on the back of each. The title of this paper is "The Prevalence of Pellagra in the United States: A Statistical and Geographical Note, with Bibliography."

THE PREVALENCE OF PELLAGRA IN THE UNITED STATES: A STATISTICAL AND GEOGRAPHICAL NOTE, WITH BIBLIOGRAPHY.

By C. H. LAVINDER, *passed assistant surgeon, U. S. Public Health and Marine-Hospital Service;* C. F. WILLIAMS, M. D., *secretary South Carolina state board of health and state health officer; and* J. W. BABCOCK, M. D., *physician and superintendent, State Hospital for the Insane, Columbia, S. C.*

Forty-five years ago two cases of probable pellagra were reported at the annual meeting of American Asylum Physicians, held in Washington, D. C., by Doctor Gray, of Utica, N. Y., and Doctor Tyler, of Somerville, Mass.

Exclusive of one case reported by Dr. H. F. Harris, of Georgia, and one by Dr. S. Sherwell, of Chicago, in 1902, the disease has since 1864 till recently—1906–7—either disappeared or been overlooked; or, what is more likely, the physician when first studying one of these puzzling cases and inclining to the diagnosis of pellagra, has accepted too readily the assertion of all authorities that pellagra does not exist in the United States, and has therefore given another and commoner name to his case, although his professional conscience may never have been satisfied.

In spite of authoritative denial of the existence of pellagra in our country, a number of cases of the disease were recognized and reported in 1907 independently by medical officers of Alabama and South Carolina asylums. Following these observations, pellagra has been observed in many different localities, such as Wilmington, N. C.; Augusta, Ga.; Charlotte, N. C.; Milledgeville and Atlanta, Ga.; and in many places in South Carolina as well as in other States.

For the last year and a half the South Carolina state board of health has been actively investigating the pellagra problem by special inquiry, conference, and original research, with the cooperation of Surgeon-General Wyman, of the United States Public Health and Marine-Hospital Service, who has assigned Passed Asst. Surg. C. H. Lavinder to Columbia, S. C., and vicinity for this purpose.

Recently an inquiry (see below) about pellagra was addressed to the superintendents of state hospitals for the insane in the United States, and the following table embodies their replies.

To 164 inquiries 120 replies were received, about 20 being in the affirmative.

State.	Number.	Recognized.	Probably existed.	Male.	Female.
New York	Few (near Brooklyn)				
Pennsylvania (Dixmont)	One	1909		One[b]	
Maryland	One or two	1909	1905	One	One.
Virginia (Staunton)	One (?)	1908			
Virginia (Petersburg)	do				
North Carolina:					
Raleigh	"Several"	Two or three years.	Ten years.		
Goldsboro	Eight	1908	do		Eight.
Doctor Taylor, Morganton	do		Twenty-two years.		
Doctor McCampbell, Morganton.	Twenty		Five years		
Doctor Wood, Wilmington	Seventy in State				
South Carolina:					
State Hospital	One hundred and twenty-five.	1907	Twenty to thirty years.	Twenty-five per cent.	Seventy-five per cent.
Doctor Williams, Columbia.	Five hundred estimated in State.				
Georgia:					
Grady Hospital, Atlanta	Ten	1907			
State Sanitarium, Milledgeville.	Two hundred and twenty-five.	1907	About twenty-five years.	Twenty-five per cent.	Seventy-five per cent.
Florida (State Hospital, Chattahoochee).	Twelve	1907	Four years	Five	Seven.
Alabama (Mount Vernon Hospital).	One hundred and fifty-four and two private.[a]	1906		Small number.	Large number.
Mississippi:					
Jackson	One; other cases in State.				
Meridian	Two	1907 (?)		One	One.
Louisiana (Pineville)	Three				
Tennessee (Baptist Orphans' Home, Nashville).	Eleven				
Kansas:					
Topeka	Six (?)		Fifteen years.	Three	Three.
Epileptic Colony, Parsons.	One		Native		

[a] Dr. G. H. Searcy estimates 150 to 200 cases in State in 1906. [b] Hungarian.

This table seems to show that there are records of about 1,000 cases of pellagra scattered in 13 States. More than half of these have been reported from asylums or similar institutions. Sporadic or suspected cases have been reported from Texas and Arkansas as well as from New York.

Dr. E. J. Wood, of Wilmington, N. C., has records of 300 cases in the South, 70 of which occurred in North Carolina. It has been estimated that "many hundred" cases exist in Georgia, and Doctor Walker, of the State Sanitarium, Milledgeville, says that 2 per cent of over 947 admissions in 1908 were pellagra.

Doctor Lavinder has reported to the surgeon-general of his service a conservative estimate of 1,500 cases in the Southern States since 1906.

The asylum officers in Maryland have not observed cases, but Dr. W. S. Thayer, of the Johns Hopkins Hospital, has recently recognized and reported a case of the disease in Baltimore, and is satisfied that he observed a similar case several years ago (1905).

Nor does the disease seem to have appeared in the Tennessee hospital for the insane, but 11 cases of pellagra have been reported as occurring in the Baptist Orphans' Home at Nashville.

Doctor Dewing, of the Long Island State Hospital, Flatbush, Brooklyn, N. Y., reports that he has had no cases of pellagra in his hospital, but "a few cases apparently from other sections of the country" have been observed in his vicinity.

Dr. C. H. Lavinder observed in New York in 1908 a case of the disease in a white American seaman in the coastwise service.

Although not within the boundaries of the United States, it deserves passing note that Dr. B. K. Ashford has reported the observation of one case in Porto Rico, and Dr. J. A. Hayne has observed two cases on the Panama Canal Zone.

While absolute accuracy is not claimed for these statistics, they may be regarded as a fair indication of the extent and distribution of pellagra, as now recognized in our country, and their presentation at this time is made for the purpose of emphasizing the growing importance of the pellagra problem in the United States.

DOCTOR WILLIAMS'S INTERROGATIONS.

1. Have you seen any case of pellagra in your institution or in your State?
2. How many cases have you seen?
3. How long since you recognized the disease?
4. If at all, how long do you think the disease has existed in your section?
5. What proportion were male? Female?
6. What was the occupation of those affected? Nationality?
7. Do the products of Indian corn (hominy or meal) form a part of the dietary of the patients, and are those products derived from native or shipped corn?
8. Were your patients from the poor, moderate, or well-to-do classes, and were they from the city, town, or country?

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NOTE.—There seems little doubt that the condition now recognized as pellagra has existed in the Southern States many years, twenty-five or thirty at least, and has been regarded as an unusual manifestation of tuberculosis, syphilis, malaria, hook worms, dermatitis exfoliativa, eczema, etc.

Probably careful search may disclose that cases of pellagra have been reported under these or other diagnoses.

The SURGEON-GENERAL. Before further discussion I wish to say that one of the objects in having this subject come up at this meeting is to show the necessity of getting statistics, and to call the matter to your attention, so that knowing that this investigation is going on, you may contribute what you can from time to time. I will now call on Doctor Harris.

Doctor HARRIS. The subject is one that has interested me for a great many years, and it has seemed to me of growing importance. As mentioned by Doctor Williams, I reported a case of the disease seven years ago. At that time I was only doing ordinary pathological work, and having very little opportunity of seeing patients; the matter drifted out of my mind, and as no others reported cases, I thought I was likely mistaken in the diagnosis. Some years later I began to see cases that were undoubtedly pellagra. The disease has increased in a remarkable manner in the South within the last two or three years. I am not in a position to say exactly how many there are in Georgia, but I should say that 1,500 would be a very conservative estimate. The chances are there are at least that number—perhaps three times as many. I have seen cases in every town I have been to recently, and quite a number in Atlanta. They are quite alarmed about it there. I see cases almost every day.

The disease differs somewhat from the old world pellagra, in that it seems to come on at almost any time in the year; certainly it is quite as frequent with us in the fall months as in the spring. The eruption is often present on the backs of the feet—a feature not observed in the disease as it occurs abroad, if we may judge from the clinical reports. Another point in connection with it that I would like to emphasize is that the asylum men who have made reports on the subject have pretty uniformly regarded their cases as being acute. It is well known that insanity is one of the most pronounced and one of the commonest symptoms of the terminal stages of the affection, and as a matter of fact these persons have been admitted to the asylums in the final stages of the disease, and later succumb to an acute infection resulting from having eaten foods containing the

poison. I have had an opportunity of studying the clinical course of many of these cases, and they are all clearly chronic.

Outside of the skin lesions and ulcers in the mouth and intestines—neither of which is constantly present and therefore not pathognomonic—the most interesting changes are those found in the central nervous system. Neither the brain nor cord has shown gross changes in any of my cases with the exception of one instance, in which the cord was exceedingly soft, presenting a macroscopic appearance of general diffuse myelitis—a condition which has been observed by Belmondo and others. I have not had sufficient time to thoroughly examine microscopically the tissues obtained from my five post-mortems, but would call your attention to the curious and characteristic alterations presented in the cords; they all show sclerosis. We find alterations of these in the posterior columns affecting particularly the middle root zones; similar changes are also found in the crossed pyramidal tracts. The central canal is closed in all instances in the part of the cord most diseased, which is usually the dorsal region. The ganglion cells show most pronounced alteration. Nissl's bodies in all parts of the affected region have usually disappeared to a greater or lesser degree and the cells appear shrunken. The nuclei can no longer be distinguished in the cells that have undergone the greatest amount of degeneration, but in others where the changes are not so pronounced vestiges of these bodies may be found. My drawings showing the conditions just described were unfortunately lost on my trip to this city, and I am therefore unable to exhibit them to you at this time. I have, however, several that were handed to me by the artist at the last moment, which were not lost; they show some of the commoner alterations found in the ganglion cells. These alterations correspond closely with those observed by Tuzzeck and others and clearly show, if there has been any doubt about it before, that we are having in the South genuine pellagra.

There is another aspect of the question to which I would like to call attention. I think it is an exceedingly important one, and as yet we are not in a position to make definite statements concerning it. I do not wish or intend at this time to say that what I state is even probably so, but I suspect that the presence of pellagra in the South is due to the improper harvesting of corn in the West. I am told by those who claim to know how it is done, that the corn is cut still in an unripe condition, stacked up on shacks, and at a subsequent time is shelled and put upon the market. I have seen outbreaks of pellagra where the people were eating bread made from western meal, and it seems to me possible that the source was in the bad harvesting of the corn from which it was made. I can not say

for certain, and I do not wish to make the assertion absolutely, but I strongly suspect that possibility. I am quite sure the disease is becoming more frequent in the South and the consumption of western meal is increasing. I base all of this on the assumption that pellagra is produced by eating corn meal containing some poisonous ptomaine.

These are the main features of the subject, as they now appear to me, sir.

The SURGEON-GENERAL. While looking into this subject I was rather surprised to find how prevalent pellagra has been in Italy and other European countries. Heretofore it has attracted very little attention in the United States, and it seems to me that it is a very important matter for the state health officers to consider, because we are able to get at it at the very beginning, and it otherwise might become endemic in part of our territory, as it has become in certain parts of Europe. It is very difficult to eliminate. I think it is important that we should pay all attention to it now before it gets a strong hold upon this country.

Doctor SWARTS. How are you going to diagnose the cases? What are some of the diagnostic points? We might make a wrong diagnosis.

Doctor PRICE. Are there any symptoms of locomotor ataxia?

Doctor HARRIS. The diagnosis is made from the clinical course. The skin lesions are only observed now and then in the spring and in the fall, once a year as a rule. Some of my cases had had it two or three or four years before, and some dated back to ten, fifteen, and twenty years, and once or twice, or three times, during that period, skin eruptions occurred—not constantly, now and then only. It only lasts six or eight weeks from the time it first begins until it entirely disappears. The symptoms of importance are that there is more or less exaggeration of the knee jerk in a vast majority of cases, in some instances it is entirely absent. The patients frequently have a sense of cold, pains in the feet, and weakness in the knees, all of which might make one suspect pellagra. The tongue and mouth are inflamed and sore during the period of eruption, and diarrhea is very common, though constipation may exist. The vast majority where the disease is severe are more or less insane. They then go to some asylum where they remain until death relieves their suffering. Some, however, recover, but there remain evidences of the alteraations in the cord.

Doctor SWARTS. What is the character of the eruption?

Doctor HARRIS. Redness with margins clearly defined on the back of the hand; later becoming scaly, and rough.

Doctor SWARTS. Does it desquamate?

Doctor HARRIS. Oh, yes; it desquamates, and sometimes superficial ulcers occur, nothing more than peeling off of the epiderm.

Doctor BRUMBY. On exposed surfaces?

Doctor HARRIS. Yes; exposed surfaces.

Doctor BRUMBY. Is it invariably fatal?

Doctor HARRIS. Yes, sir; it is, if the patient does not stop eating corn products; but there are a great many mild cases in the South unrecognized by the doctors which go on indefinitely without fatal results.

Doctor PRICE. How are those cases carried on the asylum records?

Doctor HARRIS. I think they are carried as all sorts of things.

Doctor SWARTS. Have you heard of any spinal symptoms with the mental symptoms?

Doctor HARRIS. Yes, sir.

Doctor PRICE. What is the treatment?

Doctor HARRIS. The only treatment I have seen do any good is to stop the patients eating all products of corn and full doses of arsenic; many improve, but very few of the worst cases get well.

Doctor PRICE. Can they get poisoned when it is cooked?

Doctor HARRIS. Yes; cooked, or in the shape of whisky; or anything made from corn.

The SURGEON-GENERAL. Gentlemen, are there any more comments on this? Does any gentleman wish to say anything either upon this or any other subject? If not, I think we might adjourn for to-day.

(The conference then adjourned at 6.12 p. m.)

Appendix.

State and Territorial Health Authorities in the United States.

[Corrected January 1, 1910.]

ALABAMA:

W. H. Sanders, M. D., state health officer, Montgomery.
E. M. Mason, M. D., state bacteriologist and pathologist, Montgomery.
G. M. Williamson, M. D., registrar of vital and mortuary statistics, Montgomery.

NOTE.—Under the laws of Alabama the medical association of the State constitutes the state board of health. A standing committee, called the state committee of public health, is authorized to act for the state board of health during the intervals of the sessions.

ALASKA:

(Alaska has no district board of health.)

ARIZONA:

Territorial board of health—

Governor Richard E. Sloane, president, Phoenix.
Attorney-General J. B. Wright, Tucson.
Edward S. Godfrey, jr., M. D., secretary and superintendent of public health, Phoenix.

ARKANSAS:

State board of health—

J. P. Runyan, M. D., president, Little Rock.
J. P. Sheppard, M. D., secretary, Little Rock.
John R. Dibrell, M. D., Little Rock.
R. S. Hilton, M. D., El Dorado.
B. L. Harrison, M. D., Jonesboro.
E. H. Abingdon, M. D., Beebe.

CALIFORNIA:

State board of health—

Martin Regensburger, M. D., president, San Francisco.
W. Le Moyne Wills, M. D., vice-president, Los Angeles.
Wallace A. Briggs, M. D., Sacramento.
F. K. Ainsworth, M. D., San Francisco.
O. Stansbury, M. D., Chico.
Wm. F. Snow, M. D., secretary, Sacramento.
James H. Parkinson, M. D., Sacramento.

COLORADO:

State board of health—

V. R. Pennock, M. D., president, Longmont.
L. E. Lemen, M. D., vice-president, Denver.
Hugh L. Taylor, M. D., secretary and executive officer, Denver.

COLORADO—Continued.

State board of health—Continued.

Crum Epler, M. D., treasurer, Pueblo.
George C. Stemen, M. D., Denver.
J. N. Hall, M. D., Denver.
Minnie C. T. Love, M. D., Denver.
B. F. Wooding, M. D., Denver.
Paull S. Hunter, M. D., Denver.

CONNECTICUT:

State board of health—

Edward K. Root, M. D., president, Hartford.
Joseph H. Townsend, M. D., secretary; office at Hartford.
T. H. McKenzie, C. E., Southington.
Lewis Sperry, esq., South Windsor.
Albert W. Phillips, M. D., Derby.
Arthur J. Wolff, M. D., Hartford.
Louis J. Pons, M. D., Roxbury.

DELAWARE:

State board of health—

J. W. De Witt, M. D., president, St. Georges.
J. A. Draper, M. D., Wilmington.
J. W. Clifton, M. D., Smyrna.
W. F. Haines, M. D., Seaford.
W. P. Orr, M. D., Lewes.
W. F. Davis, M. D., Dover.
A. E. Frantz, M. D., secretary and executive officer, Wilmington.

FLORIDA:

State board of health—

E. M. Hendry, president, Tampa.
H. L. Simpson, M. D., Pensacola.
John G. Christopher, Jacksonville.
Joseph Y. Porter, M. D., state health officer and secretary state board of health, Jacksonville and Key West.

GEORGIA:

State board of health—

W. F. Westmoreland, M. D., president, Atlanta.
Charles Hicks, M. D., vice-president, Dublin.
H. F. Harris, M. D., secretary and director of laboratories, Atlanta.
W. W. Owens, M. D., Savannah.
A. P. Taylor, M. D., Thomasville.
M. S. Brown, M. D., Fort Valley.
James H. McDuffie, M. D., Columbus.
Howard J. Williams, M. D., Macon.
R. M. Harbin, M. D., Rome.
Samuel C. Benedict, M. D., Athens.
Giles Hathcock, M. D., Belton.
J. B. Morgan, M. D., Augusta.

HAWAII:

Territorial board of health—

E. A. Mott-Smith, president.
C. R. Hemenway.
F. C. Smith.
D. Kalauokalani.
Jas. F. Morgan.

HAWAII—Continued—

Territorial board of health—Continued.

Jas. T. Wayson, M. D.
W. D. Baldwin, M. D.
C. Charlock, secretary, Honolulu.

IDAHO:

State board of health—

Geo. E. Hyde, M. D., president, Rexburg.
J. L. Conant, M. D., secretary, Boise.
Jos. R. Numbers, M. D., Weiser.
Attorney-General D. C. McDougal.
James Stephenson, jr., state engineer.
C. D. Mason, state chemist, Boise.
J. H. Wallis, dairy, food, and sanitary inspector, Boise.

ILLINOIS:

State board of health—

George W. Webster, M. D., president, Chicago.
Charles J. Boswell, M. D., Mounds.
R. E. Niedringhaus, M. D., Granite City.
Walter R. Schussler, M. D., Orland.
P. H. Wessel, M. D., Moline.
Henry Richings, M. D., Rockford.
James A. Egan, M. D., secretary and executive officer, Springfield.

INDIANA:

State board of health—

Geo. T. McCoy, M. D., president, Columbus.
W. N. Wishard, M. D., vice-president, Indianapolis.
T. Henry Davis, M. D., Richmond.
Fred A. Tucker, M. D., Noblesville.
J. N. Hurty, M. D., Phar. D., secretary, Indianapolis.

IOWA:

State board of health—

Attorney-General H. W. Byers, Des Moines.
Paul O. Koto, M. D. C., state veterinarian, Des Moines.
Lafayette Higgins, C. E., Des Moines.
A. M. Linn, M. D., Des Moines.
A. P. Hanchett, M. D., Council Bluffs.
A. C. Moerke, M. D., Burlington.
B. L. Eiker, M. D., Leon.
G. E. Decker, M. D., Davenport.
Albert De Bey, M. D., Orange City.
T. U. McManus, M. D., Waterloo.
Louis A. Thomas, M. D., secretary, Des Moines.
Henry Albert, M. D., director bacteriological laboratory, Iowa City.
Prof. C. N. Kinney, chemist, Des Moines.

KANSAS:

State board of health—

C. H. Lerrigo, M. D., president, Topeka.
B. J. Alexander, M. D., Hiawatha.
Clay E. Coburn, M. D., Kansas City.
V. C. Eddy, Colby.
J. B. Carver, M. D., Fort Scott.
C. S. Huffman, M. D., Columbus.

KANSAS—Continued.

State board of health—Continued.

J. A. Milligan, M. D., Garnett.
H. L. Aldrich, M. D., Caney.
W. O. Thompson, M. D., Dodge City.
C. D. Welch, attorney, Coffeyville.
S. J. Crumbine, M. D., secretary.

Members of the advisory board—

F. O. Marvin, A. M., Mem. Am. Soc. C. E., sanitary adviser, Lawrence.
William C. Hoad, B. S., Asso. Mem. Am. Soc. C. E., sanitary and civil engineer, Lawrence.
E. H. S. Bailey, Ph. D., chemist, State University, Lawrence, food analyst for board.
J. T. Willard, M. S., Agricultural College, Manhattan, food analyst for the board.
L. E. Sayre, Ph. M., State University, Lawrence, director of drug analysis.
R. S. Magee, M. D., pathologist, Topeka.
Sara E. Greenfield, M. D., bacteriologist, Topeka.
W. J. V. Deacon, statistician, Topeka.
S. C. Emley, A. M., M. D., lecturer, Lawrence.

KENTUCKY:

State board of health—

William Bailey, M. D., president, Louisville.
George T. Fuller, M. D., Mayfield.
H. S. Keller, M. D., Frankfort.
John G. South, M. D., Frankfort.
William A. Quinn, M. D., Henderson.
C. Z. Aud, M. D., Cecilian.
K. W. Coffman, M. D., Owensboro.
J. N. McCormack, M. D., secretary, Bowling Green.

LOUISIANA:

State board of health—

D. Harvey Dillon, M. D., president, Sabine Parish.
Beverly W. Smith, M. D., vice-president, St. Mary Parish.
T. T. Tarlton, M. D., St. Landry Parish.
Herman Oechsner, M. D., Orleans Parish.
G. W. Gaines, M. D., Madison Parish.
B. A. Ledbetter, M. D., Orleans Parish.
Thos. A. Roy, M. D., Avoyelles Parish.
E. S. Kelly, M. D., secretary, Orleans Parish.
Sidney D. Porter, M. D., medical inspector, Avoyelles Parish.
J. A. Estopinal, M. D., assistant medical inspector, Orleans Parish.
H. P. Jones, M. D., food commissioner, Orleans Parish.
George B. Taylor, analyst, Orleans Parish.
P. E. Archinard, M. D., bacteriologist, Orleans Parish.

MAINE:

State board of health—

Charles D. Smith, M. D., president, Portland.
E. C. Jordan, C. E., Portland.
F. C. Robinson, Brunswick.
G. M. Woodcock, M. D., Bangor.
Wallace K. Oakes, M. D., Auburn.
Richard H. Stubbs, M. D., Augusta.
A. G. Young, M. D., secretary, Augusta.

MARYLAND:

State board of health—

William H. Welch, M. D., president, Baltimore.
Marshall Langton Price, M. D., secretary, Baltimore.
Howard Bratton, M. D., Elkton.
James Bosley, M. D., commissioner of health of Baltimore City (ex officio), Baltimore.
Douglas H. Thomas, jr., Baltimore.
Attorney-General Isaac Lobe Straus (ex officio), Baltimore.
Louis A. Griffith, M. D., Upper Marlboro.

MASSACHUSETTS:

State board of health—

Henry P. Walcott, M. D., chairman, Cambridge.
Julian A. Mead, M. D., Watertown.
Hiram F. Mills, C. E., Lawrence.
Gerard C. Tobey, esq., Wareham.
James W. Hull, Pittsfield.
Charles H. Porter, Quincy.
Robert W. Lovett, M. D., Boston.
Mark W. Richardson, M. D., secretary, Boston.

MICHIGAN:

State board of health—

Angus McLean, M. D., president, Detroit.
Malcolm C. Sinclair, M. D., vice-president, Grand Rapids.
Frank W. Shumway, M. D., secretary, Lansing.
Aaron R. Wheeler, M. D., St. Louis.
Victor C. Vaughan, M. D., Ann Arbor.
Charles M. Ranger, A. B., Battle Creek.
Charles A. Blake, Detroit.

MINNESOTA:

State board of health—

Henry Hutchinson, M. D., president, St. Paul.
H. M. Bracken, M. D., secretary, Minneapolis.
F. F. Clifford, M. D., West Concord.
C. Graham, M. D., Rochester.
F. N. Hunt, M. D., Blue Earth.
J. A. Quinn, M. D., St. Paul.
C. W. Moore, M. D., Eveleth.
W. A. Jones, M. D., vice-president, Minneapolis.
B. J. Merrill, M. D., Stillwater.
F. F. Wesbrook, M. D., director of laboratories, Minneapolis.

MISSISSIPPI:

State board of health—

E. C. Coleman, M. D., president, Kosciusko.
B. A. Shepherd, M. D., Lexington.
D. J. Williams, M. D., Ellisville.
S. H. McLean, M. D., secretary, Jackson.
John Darrington, M. D., Yazoo City.
T. E. Ross, M. D., Hattiesburg.
G. S. Bryan, M. D., Amory.
L. D. Dickerson, M. D., McComb City.
W. L. Little, M. D., Wesson.
E. A. Cheek, M. D., Arcola.

MISSISSIPPI—Continued.

State board of health—Continued.

W. W. Mathis, M. D., Orwold.
J. W. Crumpton, M. D., Starkville.
I. W. Cooper, M. D., Newton.

MISSOURI:

State board of health—

A. N. Hamel, M. D., president, 3589 Arsenal street, St. Louis.
Ira W. Upshaw, M. D., vice-president, 5015 Shaw avenue, St. Louis.
Frank S. Hiller, M. D., secretary, Jefferson City.
Ernest F. Robinson, M. D., 603 Bryant Building, Kansas City.
J. A. B. Adcock, M. D., Warrensburg.
L. E. Bunte, M. D., 2003 North Market street, St. Louis.
Frank B. Fuson, M. D., Springfield.

MONTANA:

State board of health—

Governor Edwin L. Norris, Helena.
Attorney-General Albert J. Galen, Helena.
William Treacy, M. D., president, Helena.
Thomas D. Tuttle, M. D., secretary, Helena.
M. E. Knowles, D. V. S., state veterinarian, Helena.
C. T. Pigott, M. D., Butte.
D. J. Donohue, M. D., Glendive.

NEBRASKA:

State board of health—

W. T. Johnson, M. D., president, Pawnee City.
F. S. Ashby, M. D., vice-president, Fairmont.
E. J. C. Sward, M. D., secretary, Lincoln.
A. L. Muirhead, M. D., treasurer, Omaha.
W. H. Wilson, state health inspector, Lincoln.

NEVADA:

State board of health—

S. C. Gibson, M. D., vice-president, Reno.
Jno. J. Sullivan, M. D., Virginia City.
S. L. Lee, M. D., secretary, Carson City.

NEW HAMPSHIRE:

State board of health—

Governor Henry B. Quinby, Laconia.
Attorney-General E. B. Eastman, Exeter.
G. P. Conn, M. D., president, Concord.
Chas. S. Collins, M. D., Nashua.
Robert Fletcher, C. E., Hanover.
Irving A. Watson, M. D., secretary, State House, Concord.

Laboratory of hygiene—

Irving A. Watson, M. D., director, Concord.
Chas. D. Howard, B. S., chemist, Concord.
Harry F. French, B. S., assistant chemist, Concord.
H. N. Kingsford, M. D., bacteriologist in charge, Hanover and Concord.
Charles Duncan, M. D., bacteriologist, Concord.
Geo. S. Graham, M. D., assistant bacteriologist, Hanover.

NEW JERSEY:

State board of health—

John H. Capstick, president, Boonton.
Bruce S. Keator, M. D., secretary, Asbury Park.

NEW JERSEY—Continued.
State board of health—Continued.
George P. Alcott, East Orange.
H. M. Herbert, Bound Brook.
John J. Marnell, Hoboken.
William H. Chew, Camden.
NEW MEXICO:
Territorial board of health and medical examiners—
J. F. Pearce, M. D. president, Albuquerque.
W. E. Kaser, M. D., vice-president, Las Vegas.
J. A. Massie, M. D., secretary, Santa Fe.
Wm. D. Radcliffe, M. D., treasurer, Belen.
T. B. Hart, M. D., Raton.
F. F. Doepp, M. D., Carlsbad.
J. G. Moir, M. D., Deming.
NEW YORK:
State department of health—
Eugene H. Porter, A. M., M. D., commissioner.
Division of administration—
Alec H. Seymour, secretary and deputy commissioner.
Division of sanitary engineering—
Theodore Horton, C. E., chief engineer.
H. B. Cleveland, C. E., principal assistant engineer.
H. N. Ogden, C. E., special assistant enigneer.
C. A. Holmquist, C. E., assistant sanitary engineer.
C. F. Breitzke, C. E., inspecting engineer.
Division of laboratory work—
Wm. S. Magill, M. D., director state antitoxin and hygienic laboratories.
Thomas Ordway, M. D., director Bender Laboratory.
H. R. Gaylord, M. D., director Cancer Laboratory.
L. M. Wachter, chief sanitary chemist.
W. G. Fellows, assistant bacteriologist.
Division of vital statistics—
F. D. Beagle, director.
Division of communicable diseases—
Wm. A. Howe, M. D., director.
Division of publicity and education—
Hills Cole, M. D., director.
Consulting staff—
Herbert D. Schenck, M. D., opthalmologist.
Frederic C. Curtis, M. D., dermatologist.
Harlan P. Cole, M. D., orthopedist.
Walter F. Willcox, Ph. D., statistician.
John B. Garrison, M. D., laryngologist.
Tuberculosis Advisory Board—
Edward R. Baldwin, M. D., Saranac Lake.
Thomas Darlington, M. D., New York City.
Livingston Farrand, M. D., New York City.
Homer Folks, esq., New York City.
George W. Goler, M. D., Rochester.
Willis G. MacDonald, M. D., Albany.
Alfred Meyer, M. D., New York City.
Veranus A. Moore, M. D., Ithaca.
John H. Pryor, M. D., Buffalo.

NEW YORK—Continued.
State department of health—Continued.
Tuberculosis Advisory Board—Continued.
William H. Watson, M. D., Utica.
John L. Heffron, M. D., Syracuse.

NORTH CAROLINA:
State board of health—
George G. Thomas, M. D., president, Wilmington.
Thomas E. Anderson, M. D., Statesville.
J. Howell Way, M. D., Waynesville.
W. O. Spencer, M. D., Winston-Salem.
Edward C. Register, M. D., Charlotte.
David T. Tayloe, M. D., Washington.
J. A. Burroughs, M. D., Asheville.
J. L. Ludlow, C. E., Winston-Salem.
Richard H. Lewis, M. D., Raleigh.
W. S. Rankin, M. D., secretary and treasurer, Raleigh.
C. A. Julian, M. D., assistant secretary for tuberculosis.

NORTH DAKOTA:
State board of health—
Attorney-General Andrew Miller, president, Bismarck.
C. E. Bennett, M. D., vice-president, Aneta.
J. Grassick, M. D., secretary, Grand Forks.

OHIO:
State board of health—
J. C. Crossland, M. D., president, Zanesville.
Wm. T. Miller, M. D., vice-president, Cleveland.
Frank Warner, M. D., Columbus.
W. C. Chapman, M. D., Toledo.
Josiah Hartzell, Ph. D., Canton.
Darwin G. Palmer, M. D., Geneva.
Byron Stanton, M. D., Cincinnati.
C. O. Probst, M. D., secretary and executive officer, Columbus.
Paul Hansen, acting chief engineer, Columbus.
Burt Ransom Rickards, chief of laboratories, Columbus.

OKLAHOMA:
State board of health—
J. C. Mahr, M. D., state commissioner of health, Oklahoma City.
Prof. Edwin De Barr, chemist, director of board of health laboratory.
Prof. L. A. Turley, bacteriologist.
D. E. Jenner, chief clerk.
R. H. Riley, statistical clerk.
Wm. G. Capps, U. S. Russell, A. J. Emery, and H. O. Tener, food inspectors.
C. B. Bellamy, drug inspector.

OREGON:
State board of health—
W. B. Morse, M. D., president, Salem.
Andrew C. Smith, M. D., vice-president, Portland.
Alfred Kinney, M. D., Astoria.
E. A. Pierce, M. D., Portland.
C. J. Smith, M. D., Pendleton.
E. B. Pickel, M. D., Medford.
Calvin S. White, M. D., secretary and state health officer, Portland.
Ralph C. Matson, M. D., bacteriologist, Portland.
W. H. Lytle, veterinarian, Pendleton.

PENNSYLVANIA:

State department of health—

Samuel G. Dixon, M. D., LL. D., commissioner of health, Bryn Mawr.
Benjamin Lee, M. D., assistant to commissioner, Harrisburg.
Wilbur Morse, secretary, Harrisburg.
Arthur B. Moulton, M. D., chief medical inspector, Harrisburg.
B. Franklin Royer, M. D., associate chief medical inspector, Harrisburg.
Wilmer R. Batt, M. D., registrar of vital statistics, Harrisburg.
Fred C. Johnson, M. D., medical director, Pennsylvania South Mountain Sanatorium for Tuberculosis, Mont Alto, Pa.
Thos. H. A. Stites, M. D., medical inspector of dispensaries, Harrisburg.
John A. Bouse, M. D., special medical inspector on organization of local boards of health, Harrisburg.
F. Herbert Snow, chief engineer, Harrisburg.
Henry W. Peirson, chief of the division of distribution of biological products, Harrisburg.
Allen J. Smith, M. D., director of pathology, University of Pennsylvania, Philadelphia.
Herbert Fox, M. D., chief of the department of health laboratories, University of Pennsylvania, Philadelphia.

Advisory board—

Adolph Koenig, M. D., Pittsburg.
Lee Masterson, C. E., Johnstown.
Charles B. Penrose, M. D., Philadelphia.
B. H. Warren, M. D., West Chester.
George W. Guthrie, M. D., Wilkes-Barre.

PORTO RICO:

Dr. Felipe B. Cordero, director of health and charity.

Superior board of health—

Dr. Felipe B. Cordero, president.
Dr. José E. Saldaña, physician.
Lcdo. Francisco de P. Acuña, legal adviser.
Lcdo. Rafael Monagas, pharmacist.
Rafael del Valle Zeno, C. E., engineer.

Medical inspectors—

Northern district: Dr. Victor Gutierrez Ortiz, San Juan.
Southern district: Dr. Felix García de la Torre, Ponce.

Veterinary inspectors—

Dr. Thos. A. Allen.
Dr. Elías P. Fernández.

Inspectors of plumbing—

Mr. Ch. W. Brooks.
Sr. D. W. Palés.

Chemico-bacteriological laboratory—

Lcdo. Rafael del Valle Sárraga, director.
Lcdo. Manuel Guillermety, assistant chemist.

Food inspectors—

First district: Sr. Juan Torres, San Juan.
Second district: Mr. J. E. Fenner, Mayagüez.
Third district: Lcdo. Lorenzo Mascaró, Ponce.
Fourth district: Sr. E. Ronda, Humacao.

Sanitary inspectors—

Sr. Vincente Andino.
Sr. A. Díaz Busquets.

RHODE ISLAND:

State board of health—

Alexander B. Briggs, M. D., president, Ashaway.
Samuel M. Gray, C. E., Providence.
Rev. George L. Locke, Bristol.
Rufus E. Darrah, M. D., Newport.
Gardner T. Swarts, M. D., secretary, Providence.
James O'Hare, Ph. C., Providence.
John H. Bennett, M. D., Pawtucket.
R. Morton Smith, M. D., Riverpoint.

SOUTH CAROLINA:

State board of health—

Robert Wilson, jr., M. D., chairman, Charleston.
H. T. Hall, M. D., Aiken.
C. C. Gambrell, M. D., Abbeville.
E. A. Hines, M. D., Seneca.
W. J. Burdell, M. D., Lugoff.
William Egleston, M. D., Hartsville.
W. M. Lester, M. D., Columbia.
Comptroller-General A. W. Jones, Columbia.
Attorney-General J. Fraser Lyon, Columbia.
Dr. W. W. Dodson, pharmaceutical member, Laurens.
C. F. Williams, M. D., secretary and state health officer, Columbia.

SOUTH DAKOTA:

State board of health—

L. F. Babcock, M. D., president, Deadwood.
R. T. Dott, M. D., Salem.
W. E. Moore, M. D., superintendent, Tyndall.

TENNESSEE:

State board of health—

Heber Jones, M. D., president, Memphis.
T. E. Abernathy, M. D., vice-president, Chattanooga.
R. E. Fort, M. D., Nashville.
John Thompson, Nashville.
J. A. Albright, M. D., secretary and executive officer, Nashville.
John Hamel, assistant secretary, Nashville.
Louis Leroy, M. D., state bacteriologist, Memphis.
Lucius P. Brown, pure food and drugs inspector, Nashville.
Rosa S. Lemly, stenographer, Nashville.

TEXAS:

State board of health—

W. M. Brumby, M. D., president and state health officer, Austin.
T. F. Burnett, M. D., Seymour.
John W. Burns, M. D., Cuero.
Boyd Cornick, M. D., San Angelo.
H. W. Cummins, M. D., Hearne.
J. E. Gilcreest, M. D., Gainesville.
E. B. Parson, M. D., Palestine.
L. B. Bibb, M. D., secretary, Austin.

UTAH:

State board of health—

F. S. Bascom, M. D., president, Salt Lake City.
W. R. Calderwood, M. D., Salt Lake City.

UTAH—Continued.

State board of health—Continued.

S. H. Allen, M. D., Salt Lake City.
Fred Stauffer, M. D., Salt Lake City.
A. F. Doremus, C. E., Salt Lake City.
T. B. Beatty, M. D., secretary, Salt Lake City.
H. K. Merrill, M. D., Logan.

VERMONT:

State board of health—

C. S. Caverly, M. D., president, Rutland.
H. D. Holton, M. D., secretary, Brattleboro.
F. Thomas Kidder, M. D., Woodstock.

VIRGINIA:

State department of health, office and laboratories, 1110 Capitol street, Richmond.

Ennion G. Williams, M. D., health commissioner.
Allen W. Freeman, M. D., assistant commissioner.
Meade Ferguson, Ph. D., bacteriologist.
A. Lambert Martin, clerk.

Board of health—

R. W. Martin, M. D., president.
S. W. Hobson, First Congressional District, Newport News.
Stanley H. Graves, M. D., Second Congressional District, Norfolk.
J. B. Fisher, M. D., Third Congressional District, Midlothian.
O. C. Wright, M. D., Fourth Congressional District, Jarratts.
Lewis E. Harvie, M. D., Fifth Congressional District, Danville.
R. W. Martin, M. D., Sixth Congressional District, Lynchburg.
S. P. Latane, M. D., Seventh Congressional District, Winchester.
W. M. Smith, M. D., Eighth Congressional District, Alexandria.
J. H. Dunkley, M. D., Ninth Congressional District, Saltville.
Reid White, M. D., Tenth Congressional District, Lexington.
Geo. Ben Johnston, M. D., city of Richmond.
Stuart McGuire, M. D., city of Richmond.

WASHINGTON:

State board of health—

Wilson Johnston, M. D., president, Spokane.
Elmer E. Heg, M. D., secretary, Seattle.
James R. Yocom, M. D., Tacoma.
Edwin L. Kimball, M. D., Spokane.
S. B. Nelson, D. V. S., Pullman.
P. Frank, M. D., North Yakima.

WEST VIRGINIA:

State board of health—

John L. Dickey, M. D., president, Wheeling.
C. W. Halterman, M. D., Clarksburg.
L. S. Brock, M. D., Morgantown.
A. R. Warden, M. D., Grafton.
M. V. Godbey, M. D., Charleston.
J. E. Robins, M. D., Claremont.
A. N. Frame, M. D., Parkersburg.
H. M. Rymer, M. D., Harrisville.
R. E. Vickers, M. D., Huntington.
H. A. Barbee, M. D., secretary and executive officer, Point Pleasant.

WISCONSIN:

State board of health—

Wm. F. Whyte, M. D., president, Watertown.
Q. O. Sutherland, M. D., Janesville.
E. S. Hayes, M. D., Eau Claire.
L. E. Spencer, M. D., Wausau.
Hasso A. Meilike, M. D., Clintonville.
C. A. Harper, M. D., secretary and executive officer, Madison.
Lawrence P. Mayer, M. D., Hudson.

WYOMING:

State board of health—

Fred Horton, M. D., president, Newcastle.
A. W. Barber, M. D., secretary and executive officer, Cheyenne.
D. E. Brown, M. D., Diamondville.

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